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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**INTERMODAL FREIGHT
TRANSPORT LOGISTICS
APPLICATIONS FOR IMPROVING
PORT PERFORMANCE IN NIGERIA**

By

EDDIE A. K. AJON

Nigeria

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the Degree of

MASTER OF SCIENCE

in

GENERAL MARITIME ADMINISTRATION

1993

DECLARATION

I certify that all materials in this dissertation which is not my own work has been identified and that no material is included for which a Degree has previously been conferred upon me.

The contents of this dissertation reflect my personal views and are not necessarily endorsed by the University.

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TABLE OF CONTENTS

Dedication	iv
Acknowledgements	v
Abstract	vii
CHAPTER 1 INTRODUCTION	1
Background	1
Scope	6
CHAPTER 2 ORGANIZATION AND STRUCTURE	9
Ports	9
Regional Importance of the Ports	10
The Administrative Machinery	15
Public Service or Commercial Enterprise	19
Organizational Concepts	22
Free Ports and Free Zones	23
Landlord Ports	24
Operating Ports	24
Service Ports	24
Tool Ports	24
Shipping	25
Rail Transport	26
Road haulage	31
Inland Water Transportation	34
Air Transportation	35
CHAPTER 3 IDENTIFICATION OF TARGET MARKETS	36
Cargo Flows	36
Cargo Market Segments	38
Vessel Characteristics	42

Competitiveness by Market Segments	47
Cargo Forecasts	52
 CHAPTER 4 COMPETITIVE COST/PERFORMANCE ANALYSIS	 56
Marine Costs (Sea Transport)	57
Terminal Handling and Transfer Costs	59
Inland Transport Costs	59
Total Transport Costs	60
Port Safety Standards	67
 CHAPTER 5 DEVELOPMENT OF MULTIMODAL/INTERMODAL FACILITIES	 69
Port/Land Interface	70
Legal/Institutional Requirements	71
The Multimodal Transport (MT) Convention	71
Customs Procedures	72
Convention on Transit Trade of Landlocked States	74
Customs Convention on the International Transport of Goods under cover of TIR Carnets	74
Customs Convention on Containers	75
Convention on the Simplification and Harmonization of Customs Procedures	76
Inland infrastructure	76
Railways	77
Road Transport	78
Inland Waterways	78
Inland Clearance Depots	79
Information Systems	81
 CHAPTER 6 SUMMARY AND CONCLUSIONS	 87
BIBLIOGRAPHY	92

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EDDIE AJON
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ABSTRACT

Intermodal Freight Transport emerged as a response to changing marketing and distribution requirements for moving all types of cargo. Distribution has always been part of the production process whereby raw materials are sourced, transported and delivered to the manufacturer while finished products find their way to the consumer, more often than not in a different country.

The dramatic changes in market conditions in the world economy coupled with continuing technological changes and and operations in individual enterprises as well as countries in the aspect of intermodal transport chains.

The increasing need to reduce total product costs in order to remain competitive has placed much emphasis on the total distribution chain. Consequently, ports have emerged not only as anchor points for ships and as points of loading and discharging of cargoes, but more importantly, as service centres in the total distribution chain. However, this unique position of ports has to be matched by efficiency which can most appropriately be achieved through an integrated approach to the total logistics concept.

The start of containerization, intermodalism, multimodalism and logistics may be well behind us, but the end is yet to come.

CHAPTER 1

INTRODUCTION

BACKGROUND

Transport and logistics have been in existence right from the beginning of civilization. In retrospect, we encounter no problems in arriving at the conclusion that world trade, specialization and the concept of comparative advantage owe their origin and survival to the development of the different modes of transport. History reveals that the construction of the Egyptian Pyramids and the Great Wall of China depended on the availability of appropriate transport infrastructure. Further, this infrastructure owes its relevance to the appropriate logistical plans which had to be developed and properly implemented for the total success of the projects.

Today, the logistics requirements for moving cargo from consignor to consignee remain the same. However, the techniques are continually being improved with a view to rationalize an already highly developed industry. This is necessary owing to the constant erosion of profits by ever increasing operational costs.

The past decades have witnessed tremendous changes in the transport of general cargo owing to increasing percentage of transport costs on the price of products. These changes include structural, technological, operational as well as organizational changes. The main costs relating to marine transport which constitute the major areas of concern, as far

as ports are concerned, include cargo handling, ships time in ports, pilotage, etc. In an attempt to reduce these costs, the concept of unitization especially through containerization was introduced in the late '60s. In the beginning, this mode of operation was confined to the industrialized countries of North America, Europe, Australia, South Africa and the Far East where large volumes of cargo could balance trade flows. More recently, with increasing cargo volumes and the need for even greater transport efficiency, these methods have been introduced in developing countries.

One of the most important reasons for the introduction of unitization methods was the ever increasing cost of labour in the industrialized countries. It therefore became necessary to make some trade-offs between labour productivity and capital intensive transport systems so as to reduce quantitative labour inputs. Technological changes have paved the way for capital/labour substitution and increased the speed and efficiency of marine transport by increasing the speed of cargo handling operations in ports, as well as at the transfer points all along the transport chain. At the on-set of the introduction of unitization methods, containers and other units were still transported on the basis of the so-called dock to dock or sea route operation. This type of operation is still predominant in Nigeria as well as in many other developing countries where inland infrastructure is either non-existent, not sufficiently developed or too poorly coordinated for the transportation of containers into the hinterland. Furthermore, cumbersome administrative and customs procedures coupled with inadequate legislative regimes combine to preclude an ability to meet the present needs of container door-to-door transport operations. The result then, is that containers have to be stripped within the port area into warehouses and sometimes even in the open

to provide for import formalities, which in most cases are unnecessary. This means that the container has to remain in the port area instead of being utilized for the purpose for which it was originally intended i.e door-to-door transport. Where rail connections exist, there is often a lack of adequate handling facilities for container cargo.

As competition in the shipping industry stiffens and the adoption of cost cutting measures are nearly exhausted, most established operators are turning to other service improvements in order to remain competitive. Since ports have to adapt to the technological and service requirements of ships and other cargo interests, it is important that they are aware of those requirements and should even try to envisage the developments and requirements of the future.

In Nigeria, as in other developing countries, ports have traditionally been used as points of loading and discharge of cargo. They are further characterized by a completely uncoordinated accumulation of small and medium sized enterprises in the port. These enterprises compete heavily in order to obtain greater market shares in their several port functions with little or no form of active regulation. Further, the transport modes (sea and inland) operate without any planned coordination with the activities of the ports.

This form of organization and operation can be regarded as one of the contributory factors to the most disastrous period in the history of Nigerian ports, which resulted in the port congestion of the mid 1970s. However, there were clearly other factors as well. These included the amount of development capital accruing from the oil boom which clearly overwhelmed the nation's resolve to provide sufficient port

capacity, the indecision as to which of the new cargo handling facilities to adopt, the neglect of the ports as important inputs within the Third National Development Plan(1975-1980) which generated massive imports, lack of adequate handling facilities and, of-course, the totally uncoordinated approach in the cargo transfer process and assignment between the different modes of transport.

There can be little doubt that an optimized planning, organization and coordination of the whole range of activities of the different functions can be realized through public as well as private initiative. However, investment in the key functions and the proper coordination of the various activities of inland transport and ports into a cohesive network presents other problems.

Nigerian ports have a locational advantage over their competitor ports for traffic ^{with} ~~the~~ her landlocked neighbours. This advantage has unfortunately not been given due attention. Further, there is increasing competition from smaller ports in the region which naturally should serve as feeder ports if Nigeria's ports can satisfy the economic, commercial and distribution functions that major ports must provide.

It is in this regard that it has become necessary to consider the advantages, strengths, weaknesses and opportunities that exist and to decide what actions may be taken in order to optimize use of the ports. This can be done through the intergration of port and transport operations using the logistics approach in the total transport chain for the financial benefit of the national economy as well as commercial service to industry and the neighbouring states.

As we go through the '90s and move towards the year 2000, we must constantly recognize and appreciate the changes that are taking place around us. For only then can we place ourselves in the position where adaptation to those changes will become easier. This will further create the basis for the adoption of necessary strategies which will enable the ports remain relevant in the global market-place.

SCOPE

The dissertation concentrates on the development of a systemized organizational and logical approach to intermodal freight transport operations and the role of Nigeria's ports, transport infrastructure and related organizations within the framework of this concept. Some other areas which do not fall directly within the theme of the study, but which are considered as important elements of the study are also considered.

The opening chapter of the study highlights the importance of an integrated planning approach to intermodal freight transport operations and the role of ports within this framework.

Chapter 2 looks at the existing and emerging organizational, structural and institutional concepts in ports. It examines their importance and contribution to national and regional economies and considers the relevance and viability of these in the Nigerian context.

Chapter 3, identifies the different markets served by the ports, characteristics of these markets, the types of customers served (including their requirements) and the types and levels of facilities required to provide service to these markets. It also seeks to identify the strengths and weaknesses of the ports by market segment in order to lay the basis for service plans for the ports.

With the trend towards greater cost control and service improvements, some basic economic forces are beginning to

dictate major business decisions concerning cargo routes and port selection. Chapter 4 concentrates on an analysis of the harsh economic realities of the competitive market-place in which ports have now found themselves. It examines the problems and considers the actions to take.

Chapter 5, the emphasizes the assessment of facility and structural requirements for intermodal operations. According to various experts, the employment of improved transport technology in international trade can only be achieved optimally if the cargo carried and the units of carriage employed (containers) remain unbroken for at least 95% of the journey, and most importantly only if they are carried under multimodal transport arrangements. These conditions are of utmost significance for the design of infrastructure needed, including the administrative, legal and political framework within which the operators act.

Chapter 6 forms the summary of the whole study, provides the conclusions derived therefrom and recommendations on possible improvements or changes for the ports.

In preparing the dissertation, information from written questionnaires to appropriate organizations related to ports and transport companies in Nigeria, official government published gazettes and documents, library material, personal interviews and observations have formed the major sources of information.

It is hoped that this work will influence the adoption of more systemized planning, improved organization and coordination of the activities critical to intermodal freight transport operations. It is further hoped that ports will be recognized as the main service centres for export and import

cargoes, a condition which will ultimately help to create the basis for progress through industrial and spatial change.

CHAPTER 2

ORGANIZATION AND STRUCTURE

PORTS

The United Nations' Ports Administration and Legislation Handbook (New York 1969) describes the multitude of administrative forms of seaports as:

- Autonomous port authorities, whether national, state or municipal
- Governmental departments acting under a ministry, under the customs, the navy or a similar authority or under federal, state or municipal jurisdiction.
- Railway companies, either private or municipal
- Any other enterprise or combination of enterprises which may meet the particular requirements of the country concerned.

In most of these forms of port organization, public involvement is expressed in different forms and varying degrees. Most ports of the developed nations especially in Europe however prefer to present themselves as private ports with no form of government involvement or subsidy. Perhaps the EC policy of trade liberalization explains why some ports in the community would prefer to present themselves as private ports. Considering the strategic, economic, social and commercial importance of ports to a country or region, it is unlikely that any country will willingly delegate her responsibilities within the total activities of ports planning, investment and operation entirely to private enterprise. Different port organizations will be characterized by varying ratios between private and public

responsibility depending of course on the particular circumstances of any given country or port.

REGIONAL IMPORTANCE OF THE PORTS

In many countries around the world, ports are not considered as very important segments of the economy in comparison with other segments, trades or industries. The same view was held by the Nigerian government until the ports congestion crises of the late 1970s. The situation helped to highlight the fact that any disruptions in the ports activities of any country will deliver an immediate impact on the country's economy and sometimes the whole region depending on the circumstances in each case.

According to figures released by the Federal Ministry of Commerce, the following negative effects were registered as a direct result of the ports congestion of the early '70s:

- a. Demurrage estimated at \$4,100 per day per vessel for each vessel delayed in excess of ten days was paid by the Federal Government of Nigeria. In most cases, vessels had to wait for upwards of 180 days before they could secure a berth. Considering that at the peak of the crises, a total of 455 vessels were waiting for berthing space, a simple arithmetic calculation will show that a total sum of \$317,135,000 which would have been part of the nation's foreign exchange earnings was lost to foreign interests.
- b. The ports congestion gave rise to freight surcharges. These surcharges attracted freight increases of 30 -

100% at the peak. This resulted in escalating import prices of goods and commodities. The first report of the Anti-Inflation Task Force released by the Ministry of Information estimated that average import prices increased by 67.4% between 1970 and 1974.

- c. High freight rates resulting from the high freight surcharges affected Nigerian exports. Considering that transport constitutes about 20 - 25% of the final price of goods exported, a 100% increase due to the surcharges meant that the cost of Nigerian exports increased by between 40 and 50%. This militated against the competitiveness of Nigerian products on the world market. As profits for the country's exports declined, exporters were forced to divert their capital resources to other ventures where return on investment was higher. This marked the turning point for export of Nigerian agricultural products.
- d. The crises in Nigerian ports quickly spread to other ports of the West African sub-region. In an attempt to ease the congestion in the ports, ships were diverted to other West African countries particularly Ghana and Benin. Under an agreement reached by these countries' governments, Ghana and Benin agreed to allow Nigerian cargo to be discharged at Tema and Cotonou. With this arrangement, congestion gradually spread to these ports where traffic had been diverted. Consequently, these ports started to report delays. According to Rowe 1980, delays of between 15- 30 days were reported by the Nigerian ports in 1977.

Following the congestion crises, government response to ports became more positive. This was demonstrated by the speech of the then Head of State General Yakubu Gowon during the launching of the nation's Third National Development Plan in 1975 which included the statement that government aimed to provide "excess port facilities as a means of avoiding the expensive delays currently being experienced", (General Gowon 1975, 15). The crises however turned out to become the turning point in the history of ports development in Nigeria. In 1975, following the crises and the subsequent policy statement by the Head of State, ports development assumed a very important role in the National Development Plan of 1975 - 1980 and has continued subsequently.

On the other side of the spectrum, ports provide an important source of socio-economic development of a nation and or region. Perhaps the example of the ports of Bremen and Bremerhaven are a good illustration.

The ports of Bremen and Bremerhaven are owned by the City State of Bremen. The state government provides the infrastructure for these ports whose actual operations are contracted out to Bremer Lagerhaus Gesellschaft (BLG), a private company with some government shareholding. In 1983, about 93,000 jobs representing 27% of all jobs in Bremen were either directly or indirectly dependent on the port and others directly or indirectly dependent on the activities of the access to deep water channels for the ocean going ships (Dr. Holocher 1990).

The period between 1950 and 1983, the government of Bremen spent 8.5% of all her public expenditure on the port of Bremen. This represented 4,042 million DM in public

expenditure as against 1,533 million DM in public income (harbour dues etc.) realized by the port. This means that the income represented only 38.1% of expenditure (Dr. Holocher 1990). See Fig. 1.

Between 1979 and 1983, the City State of Bremen paid out 140 million DM per annum as subsidies to its ports. Considering the negative rate of return on investment recorded, it is unlikely that any private company would voluntarily want to get financially involved in such an activity.

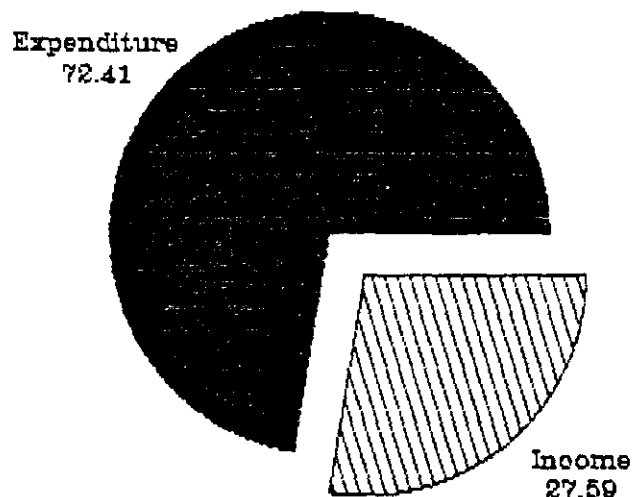
There however exists a multitude of benefits accruing to the public which arises as a result of the activities of ports which are of enormous interest to national or regional authorities.

For example, every year the City State of Bremen collects taxes from jobs which depend directly on ports amounting to about 150 million DM. Compared to 140 million DM spent by the government in subsidies, revenue far exceeds the expenditure as illustrated by Fig 2.

When taxes and other incomes depending directly on the ports are added, the City State receives far more than it gives in subsidies (current and investment). This is a very clear demonstration of the important position of ports in a national or regional economy. According to Dr. Holocher, the impact of ports on public finance, depends, however on the physical structure of the economy, i.e. the distribution of tasks and taxes between central, local and other authorities. (Dr. Holocher 1990 p.64).

FIG.1

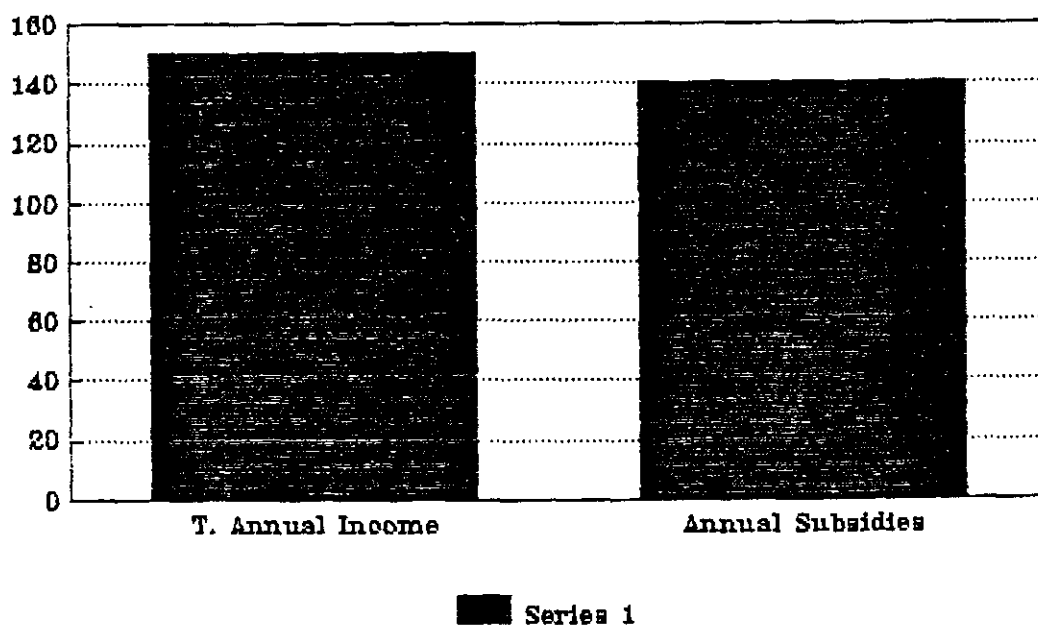
Annual expenditure/income Bremen ports, 1979 - 1983



Source: Dr. Holocher 1990

FIG.2

Annual Subsidies/Income Bremen Ports (Million DM)



Source: Dr. Holocher 1990

THE ADMINISTRATIVE MACHINERY

The Nigerian Ports Authority (NPA) was established by the Ports Act 1954. Before its establishment, Nigerian ports and harbours were controlled and managed by eight different departments of the government. The establishment of the NPA was intended to allow for a more consistent and integrated management of the major ports. In pursuance of its statutory duties as contained in the Act, the NPA was vested with the responsibility for:

- a. The provision and operation of cargo handling and quay facilities as may appear to the authority to best serve the public interest in all Nigerian ports.
- b. Maintaining, improving and regulating the harbours and approaches thereto in all the ports of Nigeria presently open to ocean going vessels and in such other ports as may be designated.
- c. Dredging to desired depths and providing as well as maintaining pilotage services, lightering, light houses, buoys and other navigational aids in all Nigerian ports.

At the time the Ports Act of 1954 was promulgated, the intention was to create the basis for a cohesive management and control structure taking cognisance of the level of conflict that would have existed between eight different departmental interests. However, is this argument valid now or in the future ?

The increasing need to reduce total transport and consequently production costs in order to remain competitive has placed much emphasis on the total distribution chain. Consequently, ports have emerged not only as anchor points for ships nor as points of loading and discharging of cargoes, but more importantly as service centres in the total transport chain. Further, the dramatic changes in market conditions in the world economy coupled with continuing technological changes and developments with particular reference to unitization methods have brought about several structural changes. These changes are not only relevant in sea transport but also in land modes with ports as transfer and service centres.

The emergence of unitization methods has created the basis for multimodal transport operations. The objective of intermodalism from a logistics point of view is to maintain a continuous flow of goods throughout the entire transport and transfer process and by so doing, to increase overall transport efficiency by aiming at an optimum modal split within the transport process.

Within the framework of such an integrated transport system, ports can no longer be considered as terminal points of the different transport modes but rather as an indispensable link in the chain right from the shipper to the consignee. The most important emerging trend is to upgrade or restructure port activities from the traditional cargo handling at the terminals to a more comprehensive service package including storage and distribution. According to Professor Dr. Stuchtey, the emerging concepts can be summarized as providing essential logistics support to the exporting and importing industries. More specifically, it involves information, documentation, storage and distribution

services. With the use of simple computers, the electronic data processing (EDP) support to customers may include such services as advising arrival of goods to consignees and shipping companies, scheduling goods prior to arrival of vessel, stock receiving, stock monitoring, quantity and quality control reports, stock despatch reports, despatch statistics, possible batching of individual consignments, delivery notes, customs papers, provision of trade statistics etc. (Stuchtey 1990 p.21).

In pursuance of its policy of privatization and commercialization as a response to the evolving dynamics of the business environment, the Federal Government decided to commercialize the activities of the NPA amongst other parastatals. This is contained in the privatization and commercialization Decree No. 25 of 5 July 1988.

Pursuant to the provisions of this decree, the NPA evolved new strategies and a set of corporate objectives in addition to those provided under the Ports Act of 1954:

- a. To make the provision and operation of port facilities in Nigeria its dominant business, and therefore optimize the contribution of this "core" port business.
- b. To expand into new related areas of activity or areas that are a logical development of the skills, knowledge and competence inherent in the core business.
- c. To manage the workforce as a resource and not merely as a cost and therefore accelerate the tremendous retraining effort that will be required under

commercialization in addition to capitalizing further on the management skills acquired over the years.

- d. To be more customer oriented and therefore to open up and streamline its management structure as part of a larger effort to listen and respond to customers needs.
- e. To conduct all its operations efficiently, effectively, competitively and profitably and thus generate significant amounts of contributions to the national economy.
- f. To offer landlocked countries unimpeded access to the sea.
- g. To cooperate with neighbouring ports in the provision of common services.
- h. To optimize the generation of sufficient off-shore revenue.
- i. To maintain a credit worthy posture and remain attractive to national and international investors in the ports..
- j. To pay competitive and attractive wages, motivate through welfare services and retain an optimal workforce.
- k. To reform and modernize dockwork in order to bring industrial harmony to the dock industry.
- l. To explore the possibility of attracting reputable international organizations as technical partners or in joint ventures.

- m. To maintain an up-to-date management information system in all aspects of the authority's activities.

Considering the provisions of the Ports Act of 1954 and the the new provisions prescribed under the Privatization and Commercialization Decree of 1988, it is evident that the authority is required to perform the public service function of providing and maintaining infrastructure (dredging, buoys, quay walls, lighting, lighthouses and other navigational aids in all Nigerian ports) as well as to pursue the commercial objectives of profit maximization.

As far as the day-to-day general administration is concerned, the existing structure may not constitute much of a problem. However, the dictates of commercial enterprise will constitute other problems. An attempt will be made to consider these in more detail in the following sections.

PUBLIC SERVICE OR COMMERCIAL ENTERPRISE

Port ownership is usually characterized by two extremes:

- a. Public ports where all services and activities are carried out by either one or several public organizations with little or no form of private participation.
- b. Wholly private ports where all services and activities are performed by one or several private organizations.

As stated earlier in the chapter, ports have a very strategic, economic, social and commercial importance to countries. Further, under chapter 5, Regulation 14 of the International Maritime Organization (IMO) Convention for the Safety Of Life At Sea (SOLAS 1974/78), the provision and maintenance of navigational aids in port approaches is a mandatory public service obligation by states party to the convention. This makes the provision of these services a public service function.

Though fees are charged for use of these services, it is unlikely that the revenues collected will cover the amount of investment as illustrated by the Bremen/Bremerhaven case earlier in this chapter. If these fees collected from the public service functions do not cover the amount of investment, how is this activity expected to operate within the framework of a commercially oriented enterprise?

It may be argued that the indirect revenues (income taxes, corporate taxes, customs duties etc.) when added to the direct income from harbour dues, lightering, etc., may more than compensate for the cost of investment. However, it must be noted that the indirect revenues go directly to the government treasury, while the fees from the public service functions are collected by the Ports Authority. In commercial accounting terms therefore, how can these different types of revenues be measured against investment in the company balance sheet and profit and loss account?

In my opinion, it is much easier and logical to have a public service organization or department which should be responsible for the provision and maintenance of infrastructure, while a separate commercial enterprise is

given responsibility for investment in superstructure, operating equipment, other facilities and port operations. Under this arrangement, the following benefits may accrue:

- a. It will be easier for government to measure cost against benefits by comparing the direct revenues from the public service function and the indirect revenues from the port and shipping related services.
- b. Substantial savings through the removal of subsidies will be made with particular reference to superstructure including operating equipment and facilities. These savings can then be utilized for investment in other projects as the commercial enterprise (port operator) can seek alternative sources of finance.
- c. Performance measurement of the commercial enterprise will be easier as its efficiency, effectiveness and balance sheets will become more transparent.
- d. Concentration on specific tasks for the two organizations will encourage and enhance specialization. If the operating company can focus its attention on the core business of port operations without government subsidy and fully relate its position to the business environment, it is more likely that innovation and efficiency will become a crucial corporate strategy. It is under this condition that the ports will realize and subsequently decide to take full advantage of their strategic position as a hub port.

If however, the NPA is expected to operate under the existing arrangement and still make a profit, the organization will be

forced to increase charges far above reasonable limits so as to cover both the costs of the commercial as well as the public service functions. This will consequently limit its competitiveness within the region.

ORGANIZATIONAL CONCEPTS

Over time, the administrative structures of ports all over the world, through which customers' requirements are met have changed dramatically and vary from country to country. Customers' requirements on the other hand have remained basically the same. Even within the same country, these structures may vary from one port to the other. These structural concepts are gradually gaining acceptance in Nigeria with the declaration of Calabar port as a Free Export Processing Zone (FEZ) in 1989.

According to Jean-Georges Baudelaire, the evolving state of affairs can only be explained by historical reasons and by the political, economic and social environments within which ports carry out their activities (Baudelaire 1986). It is therefore not a surprise that different ports, including the most developed are administered in different ways. The different management techniques and operational methods have to be devised so as to meet the particular needs of each port.

Within the context of this study, it is not necessary to make a detailed analysis of the different structures that exist.

However, a brief description of these principles is desirable. This will however be confined to the definition of the different systems that exist around the world.

Free Ports and Free Zones.

Ports constitute a focal point for the international transportation of cargo by sea. Government interest in the regulation of the movement of goods, vessels and people in and out of their territories can not be over-emphasized. The regulatory methods being employed such as vessel inspections, customs clearance procedures, import and export taxes, immigration etc. may however produce negative effects as far as efficient cargo transfer operations are concerned.

The underlying principle of free zones is to try and eliminate, change or reduce these regulatory methods in order to facilitate efficient and continues cargo flow. There are different types of free zones. These include, Free Trade Zones (FTZ), Industrial Free Zones (IFZ), Free Ports (FP), Free Enterprise Zones (FEZ), etc.

Of all the Nigerian ports, only Calabar port falls within the description of an Industrial Free Zone (IFZ). An Industrial Free Zone is an area designated to be outside customs barriers, normally close to or within the port area. The area so designated offers fiscal as well as regulatory incentives which include duty free movement of goods in and out of the zone (imports and exports). The intention is to encourage the establishment of export industries by local as well as foreign investors. Due to the commercial requirements of shippers in these areas coupled with their established trade routes and the limitation on delivery times

for exports as well as imports, logistics requirements will invariably be higher and to some extent easier to implement by port authorities or operators.

Landlord Ports

Landlord ports are those where the responsibilities of the authority are limited to the provision of infrastructure and other services of general public interest. As the name denotes, the port authority who is the landlord rents out its port premises to lessees but does not take any active part in the operational activities of the port.

Operating Ports.

These are ports where the port authority is responsible only for cargo handling ashore while other activities are carried out by separate companies/organizations.

Service Ports

Under this arrangement, the port authority is responsible for all cargo handling activities. A typical example of service ports is the former Soviet Union where all the services and facilities for ships, cargo and land carriers were provided by the port authority.

Tool Ports.

In tool ports, the port authority provides the infrastructure, some superstructure including cargo handling equipment. The authority does not however engage in cargo

handling. It only supplies the tools necessary for private enterprise or independent agencies to operate.

In view of the different characteristics and requirements in different ports, it is not surprising to find a mixture of all or most of these concepts in various ports of the world. This is particularly the case with Nigerian ports. The efficacy of any one of these concepts will depend ultimately on the socio-economic situation of the particular port.

SHIPPING

Nigeria's direct participation in shipping began in 1959 with the establishment of the state owned Nigerian National Shipping Line (NNSL). The company commenced operation in the same year with two own account conventional general cargo vessels with a total capacity of 19,450 Tonnes Dead Weight.

Due to the enormous capacity outlay in the industry coupled with the foreign exchange content and level of incomes at the time, indigenous private participation was non-existent. Consequently, the development of the industry at national level was exclusively the preserve of the national carrier. As international trade expanded, so did the government's desire to secure a fair share of the activity and income therefrom. This resulted in a tremendous increase in the level of subsidy to the company with a corresponding growth in fleet size. By February 1987, the national fleet size had grown to 19 conventional general cargo vessels with a total tonnage of 268,000 Dead Weight. The position of indigenous shipping was further strengthened by private participation

which increased the total displacement Gross Tonnage to 587,000 by 30th June 1988.

This sudden private sector interest in shipping may be explained by some factors which include among others:

- A. The rapid expansion of the nation's external trade which offered substantial amounts of cargo traffic with corresponding financial benefits to shipowners.
- B. The development of the National Shipping Policy in 1981 to encourage private indigenous participation in the industry.

The incentives offered by the 1981 Shipping Policy were in the form of:

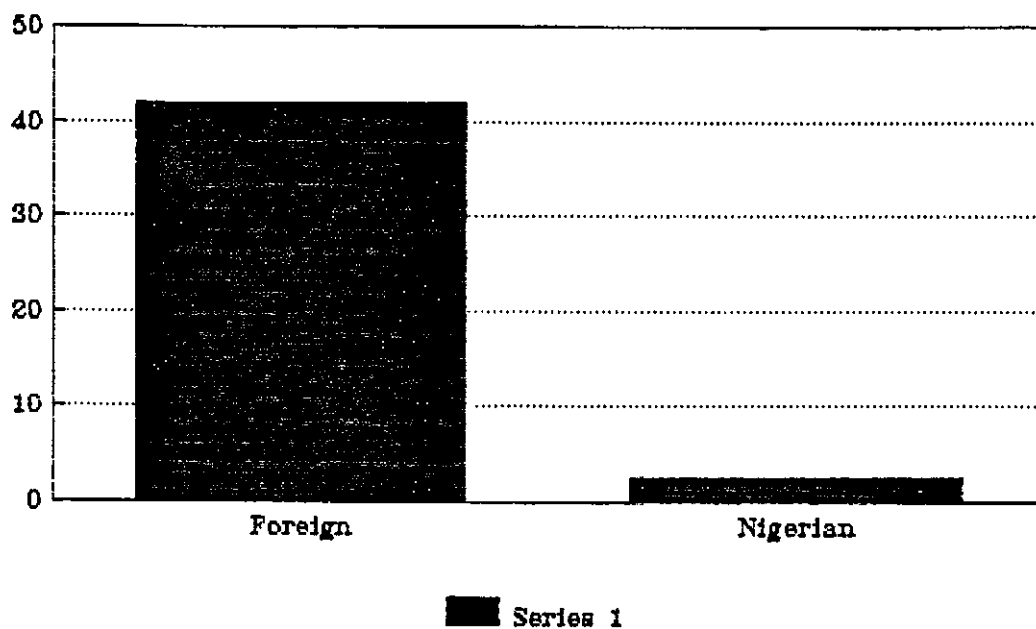
- a. Low interest loans
- b. Cargo preference schemes
- c. Operating subsidies
- d. Accelerated depreciation allowance
- e. Cabotage restrictions
- f. Interest subsidies and
- g. Accumulation of tax-free reserves.

The erstwhile growth in tonnage and fleet size however has not achieved its desired objectives as far as the fair participation of indigenous shipping in the nation's external trade.

Between 1980 and 1988, total seaborne trade through Nigerian ports amounted to 152,533,415 metric tonnes. Of this figure, the volume of cargo carried by Nigerian registered vessels amounted to less than 15%. Fig.3 and 4.

FIG.3

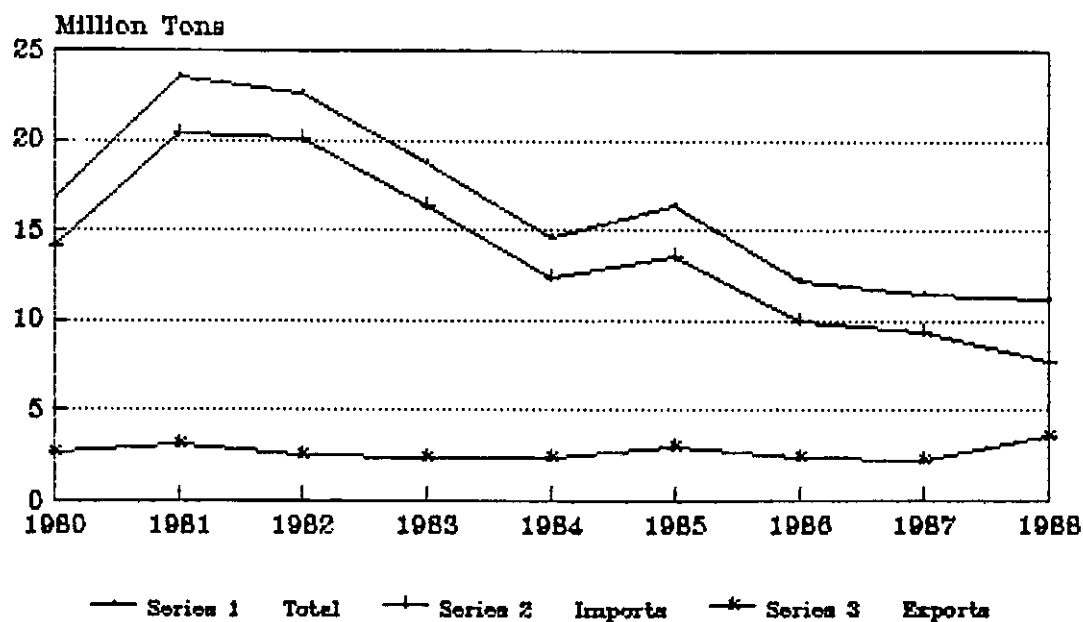
Tonnage of vessels entering Nigerian ports. Jan.-Dec.1987



Source: NPA Statistics 1989

FIG.4

Total Seaborne Trade. (excluding crude oil) 1980-1988



Source: NPA Statistics 1989

The inability of these huge investments in shipping to achieve the desired objective may be attributed to several problems, some intractable. These include:

- a. Poor coordination of services between the line and the ports and the lack of intergration of modal services which may appear to have been as a result of neglect at the planning stage of transport development in the country.
- b. Poor management which, unfortunately, happens to be prevalent in all public transport organizations in the country. This was summed up in a statement within the Third National Development Plan of 1975 - 1980 viz; "Management remains the most intractable problem of the public corporations and companies operating in the transport sector".

RAIL TRANSPORT

Since the introduction of containers, the use of railways for intermodal movement of cargo is becoming increasingly important. Subsequently, any discussion about efficient cargo movement through a port must make reference to the possible use of railways.

The railway system was established in Nigeria as a department within the Federal Ministry of Transport in 1898 by the British Colonial administration. The underlying objective for the railway system then was to open up the hinterland into primary product areas. This tended to form the immediate objective and consequently overwhelmed the commercial aspects of its operation. In an attempt to free the rail system from

the degree of bureaucracy and rigidity of the civil service, the Nigerian Railway Corporation (NRC) was formally established in 1955 to operate as a semi-commercial public utility.

Since its establishment, the rail system has made very significant contributions to the country's socio-economic development. The system has further made an immense contribution through the provision of the necessary machinery for foreign, domestic trade, industrial and spacial change. According to figures released by the NRC, the railways played a dominant role in both freight and passenger traffic during the first period of its inception, accounting for 85% of export traffic and 68% of import traffic in 1955/56. By 1977, this position had dramatically been reversed with road transport accounting for 89% of import and export traffic passing through Lagos ports and 95% of traffic through Port Harcourt, while the railway's share slumped to 11 and 5% of traffic through the ports of Lagos and Port Harcourt respectively. The corporation's financial position also declined as a declared operating profit of 9 Million Naira in 1963/64 declined dramatically to an operating deficit of 43 Million Nigerian Naira in 1981.

Though the volume of cargo carried by rail increased from 0.995 million metric tonnes in 1978/79 to 2.142 million tonnes in 1981, this did not represent a significant share of the total volume of traffic generated during the period. Table 1.

A comparative cost analysis carried out by the Nigerian Railway Corporation in 1981 in selected commodities showed that the cost of transporting these commodities by rail is 30 and 40% of road haulage costs. The loss of rail's market share can be attributed to several reasons related to the

choice of road transport over rail inspite of the cost differential and its subsequent loss of market share can be attributed to several reasons. These include:

- a. The excessive reliance by the NRC on the traditional export (primary) products which had declined tremendously.
- b. Lack of cordination with the Ports Authority which would have enabled them to predict changing trade and traffic patterns.
- c. The decline in the quality of services which include speed, reliability, safety, certainty of delivery times, good customer relations and flexibility.
- d. The management factor highlighted earlier in the chapter.

Table 1.

% SHARE OF CARGO BY MODE 1978 - 1981

	1979	Mod.Split 1980		Mod.Split 1981		Mod.Split
Road	18.50	92.10	16.40	91.80	21.00	88.90
Rail	1.20	5.90	1.40	7.20	2.10	8.80
Water	0.40	2.00	0.20	1.00	0.50	2.30
Total	20.10	100.00	18.00	100.00	23.60	100.00

Source: NPA Statistics/Olanrewaju 1986.

ROAD HAULAGE

For many countries, road haulage has been and may continue to play a dominant role in domestic cargo movements. A position which owes its survival to the flexibility of the truck. In Nigeria as in most other parts of the world, the road haulage industry is characterised by a very large number of operators dominated by small scale out-fits. This is as a result of the competitive nature (free entry and exit) of the industry coupled with the level of economic development and increasing public investment in road infrastructure.

The high level of flexibility prevalent in road transport enables it to offer a better quality of service. The features of this service include door-to-door pick-up and delivery of goods, eliminating the need for intermediate transfer points. The existing structure and methods of operation however raise serious questions as to whether these operations can reap the benefits of economies of scale where total costs will rise but less than proportionate to output as output is increased or where average variable costs decrease when output is increased.

According to Falola and Olanrewaju, there exist the possibility for economies of scale in the road haulage industry, provided the annual output scale is not beyond 5 million vehicle kilometres or the fleet size does not exceed 142 vehicles. (Falola and Olanrewaju 1986 p.52). The study stopped short however on differentiating between the different sub-sectors in the industry. Obviously, the costs of running a refrigerated vehicle are far higher than those of a general goods vehicle.

As indicated earlier in the chapter, road haulage has been and continues to be the dominant mode in inland freight movements. According to available figures published by Falola and Olanrewaju, between 1956 and 1965, cargo movements by road increased from 2,208 million ton-kilometres to 4,240 ton-kilometres, an increase of 92.03% representing a modal split of 52.54 and 62.62% respectively. Conversely, market share by rail over the same period fell by 15.67% though the actual size of movements increased by 6.66% as illustrated by Table 2. (Falola and Olanrewaju 1986 p.53)

Another reason for the dominance of road haulage in inland transportation has been a direct result of the national transport investment policy over the period. The development of the country's road system has been given a very high priority in the total transport planning efforts. Between 1962 - 1968, a total sum of 169 million Naira was allocated to road development. This increased to 7.5 billion Naira in the 1981 - 1985 plan period. This represented a percentage allocation of 54% in 1962 - 1968 and 70% in 1981 - 1985 respectively. This means that over the period, more than two-thirds of planned capital investment in the transport sector was allocated to road transport.

The road network with its better haulage service characteristics were developed in parallel to the rail network with its service disadvantages. This gave a tremendous boost to the improvement of traffic performance to road haulage.

On a macro-economic level, the separation of the providers of infrastructure and the suppliers of services in transport

provides other economic complexities. For instance, the decisions of an individual shipper to use any particular mode may benefit the individual shipper. However, this may have serious negative consequences on the economy and society. This is one of the reasons why an integrated approach to planning in this sector has become even more important for the optimal allocation and utilization of resources.

INLAND WATERWAY TRANSPORTATION

Inland waterway transportation has been and is still being used extensively in other parts of the world (e.g. United States) for domestic cargo movement. In Nigeria, inland waterway transportation has remained relevant in the overall transport system of the country. This is largely due to the vast coastline including several rivers, creeks and lakes with regards to both cargo and passenger traffic. In order to take advantage of the existence of these rivers and creeks for the provision of low cost waterway transportation, the government established the Central Water Transportation Company.

Despite these efforts by the government, inland water transportation in the country has remained stagnant over the past decade. Current statistics to illustrate this are unavailable. However, figures published by Falola and Olanrewaju for the period 1965 - 1976 showed a market share of 6.63%. Unfortunately, the United Africa Company (UAC) which operated inland river terminals for the transportation of primary products suspended their operations in the mid

1970s. Though coastal services still exist, the lack of accurate data invalidates any in-depth analysis.

AIR TRANSPORTATION

As far as air transportation is concerned, domestic air services are dominated by passenger traffic. A few pure cargo services are operated on some international routes. This however caters for high value and perishable goods as is the normal case with air cargo transportation. Current available data do not show the existence of any services linking the ports with air transportation. This may be largely due to the types of cargoes (low value) transported by sea, their relative low sensitivity to time and the required distances which can be covered within reasonable times by other modes at reasonable rates. There are currently over 10 private airlines operating primarily domestic services with a few regional flights. The national carrier, Nigeria Airways is the dominant carrier on domestic and international routes.

CHAPTER 3

IDENTIFICATION OF TARGET MARKETS

CARGO FLOWS

One important measure of port activity is the traffic volume or cargo throughput. Available data covering the period 1981 to 1991 are used to analyse overall cargo flows. The purpose of this is to try and allocate the different cargo types so that the volumes aggregated by primary trade routes will reveal any shifts in trading patterns affecting the areas in which the ports operate.

It can be said that the volume of cargo throughput in a port is closely related to the number of vessels calling at the port. The analysis in this section however concentrates on actual cargo flows. This is because vessel call analysis is covered under the section dealing with vessel characteristics.

Fig. 5 shows the total import/export cargo (excluding petroleum/liquid bulk) handled through Nigerian ports for the period 1982-1991. Of all the traffic handled, 79.5 % represented import and 20.5 % exports. This reveals the big gap between imports and exports with imports dominating the trade. The figures further reveal an overall decline in cargo flows over the period especially for import cargo. This decline may be attributed to the government ban on some import products which were considered either as luxuries or

FIG.5

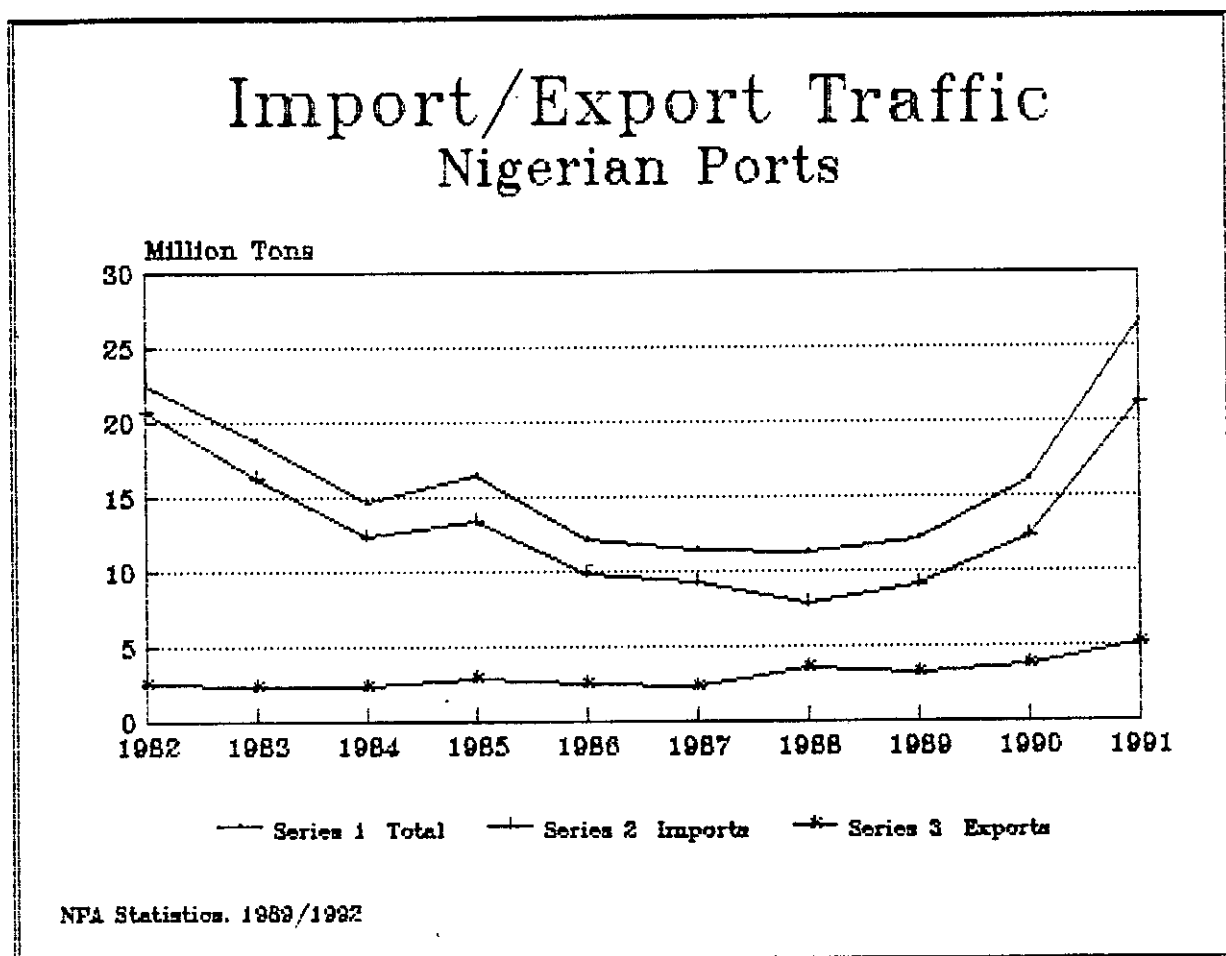
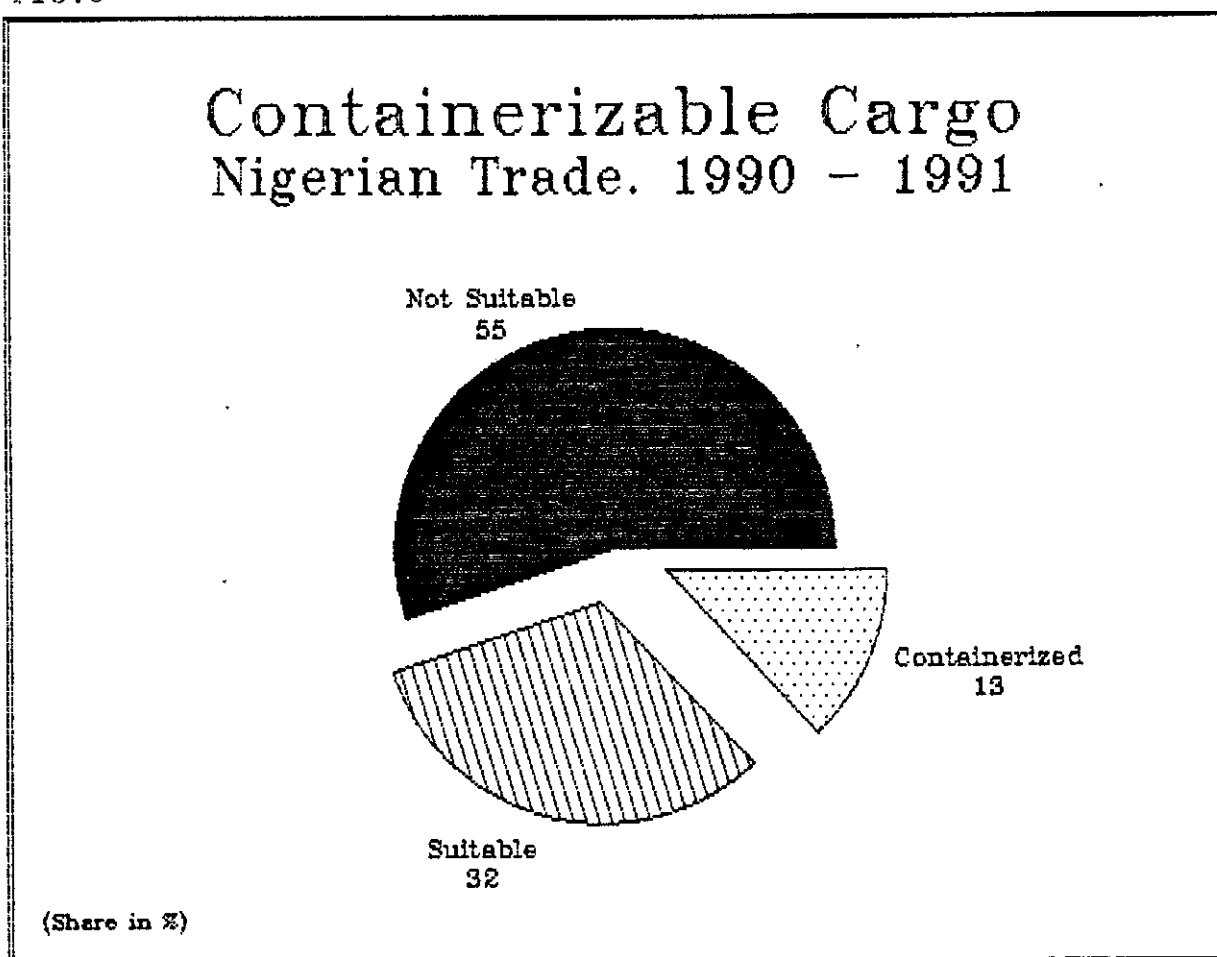


FIG.6



locally available. This was one of several measures in the government's attempt to revamp the ailing economy. Another explanation for the decline may be attributed to a diversion of shipments to neighbouring ports.

The above analysis indicate a slight improvement in export cargoes. Though available data do not indicate the main types of cargoes exported, the ports need to analyse them further so as to be able to determine future handling requirements.

A further analysis carried out is based on the ports' trade for 1990 - 1991. A total of 14,303,847 tons (excluding liquid bulk) were analysed to establish the actual amount of containerized cargo and those that are suitable for containerization. The result revealed that 1,947,571 tons representing 13% of the total cargo was containerized and 4,448,251 (mostly general and palletised cargo) representing 32% categorized as suitable for containerization, Fig.6. This means that the ports may actually expect that about 45% (13% + 32%) of cargo movements could be carried by containers.

CARGO MARKET SEGMENTS

In order to have a better perspective of the ports' market place, it is important to determine the historic and current trade patterns for total waterborne trade by trade route and inland geographic region. For the purpose of this study, market segments will be defined by trade routes, inland origin and destination and where and if applicable, by the two.

In interviews conducted with the ports, forwarders and shippers, it was difficult to obtain accurate figures on cargo flows by international trade routes and especially by inland regional distribution. Figures published by NPA however, indicate that total cargo throughput (imports and exports) handled at Nigerian ports between 1982 and 1991 excluding petroleum products amounted to 96,729,559 metric tons. This is represented by:

General cargo	=	57,050,560
Containerized cargo	=	14,953,335
Dry bulk/Others	=	24,725,644

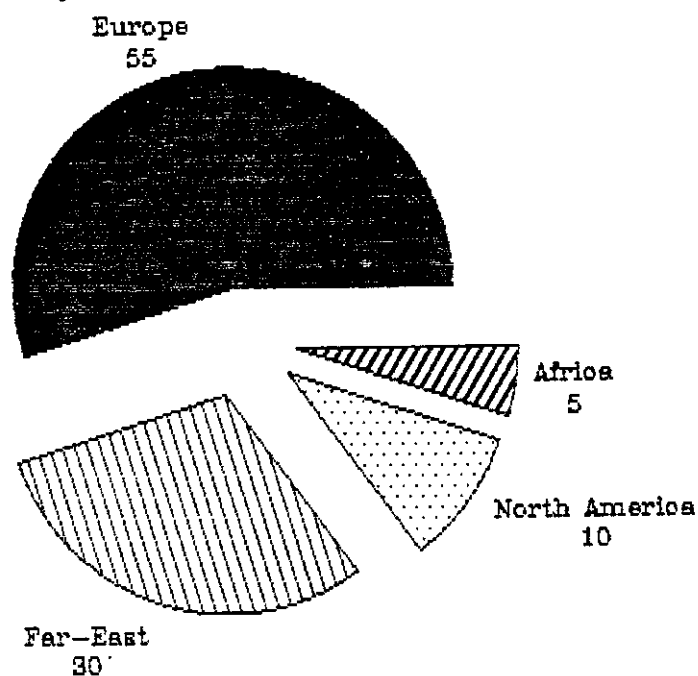
Of this figure, a total of about 53,201,257 tonnes representing 55% of the total waterborne trade is either exported to or imported from the European Economic Community (EEC), 30% to and from the Far-East, 10% to and from North America and only 5% to and from African countries. Fig.7.

These figures reveal the EEC as constituting the biggest single trading partner with Nigeria. When the figures are presented graphically however, a different trend emerges. In Fig.8 for example, while the nation's trade with the EEC has been on a steady decline over the period, trade with the Far-East has experienced a steady growth from a mere 3% in 1981 to 30% in 1991. This shows an annual growth rate of about 3 - 5%. Trade with North America also declined slightly due to a government ban on wheat as one of the measures to conserve foreign exchange.

Assuming that the EEC and the Far - East trades are going to remain the most important for the ports in terms of volumes and or value, it is of the utmost necessity that the ports

FIG.7

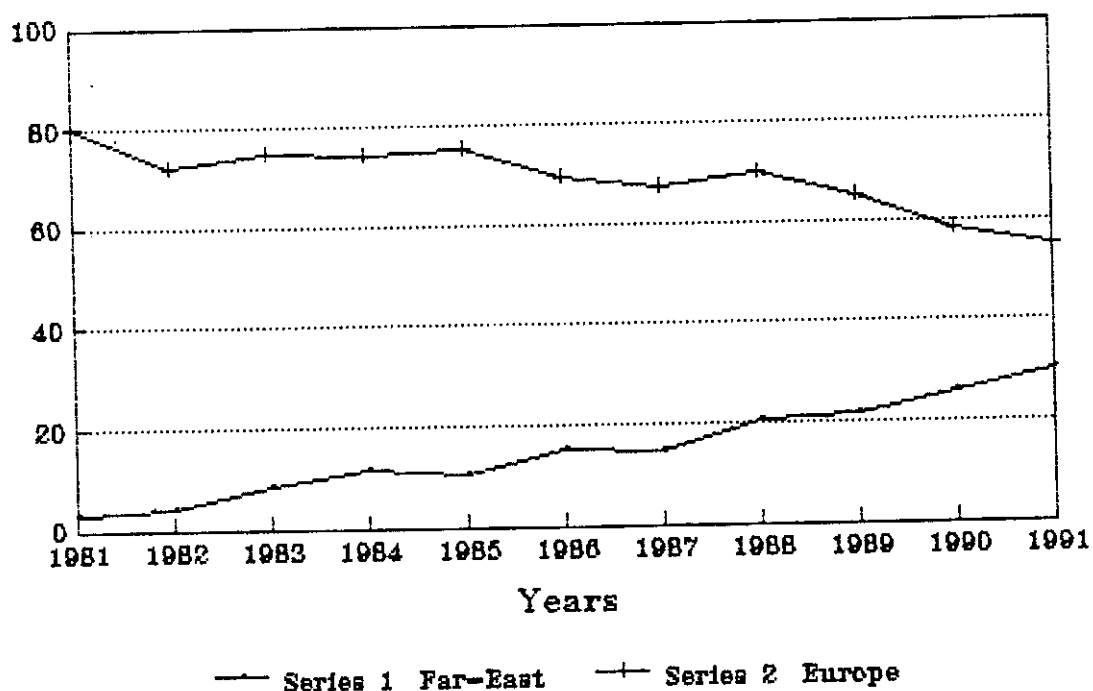
Market Share (In %) By Trade Route



MOC Statistics 1990

FIG.8

Trade Shifts By Route



MOC Statistics 1992

are aware of traffic and economic trends in these markets. This is necessary so as to place the ports in a position to be able to predict future traffic trends and consequently handling requirements.

A research study conducted by DRI/McGraw-Hill and Temple, Baker and Sloan (TBS) for World Sea Trade Service in 1991 illustrated here by Fig.9 shows that containerization has become the dominant unit of carriage for the Europe/Far-East trades. The most important point of the study is that it covers all the countries of the Organization of Economic Cooperation and Development (OECD) and the Newly Industrialized Economies (NEIs). These countries constitute the major areas of economic and commercial activity in the global economy. This is an indication that the activities of Nigerian ports will be greatly influenced by trade patterns in those economies.

The study estimated that about 85% of all cargo movements to and from OECD and NIE countries will be containerized by the year 2000. These estimates must be compared with my earlier estimates of 45% for Nigeria over a five year period i.e. by 1998. The low estimates for Nigeria were however based on the fact that most outbound cargoes are primary products which are not suitable for containerization. It must be realized that these estimates are based on simple statistical regression models and can be influenced positively or negatively by unforeseen factors.

VESSEL CHARACTERISTICS

Over the past decades, technology has become one of (if not) the most influential aspects of change in ports. Most of the traffic which used to be conveyed as break-bulk cargo are now shipped as unitized cargo in specialized vessels. During this period, the most dramatic development in general cargo transport has been the growth of these highly productive ships particularly container, roll-on/roll-off and barge carrying vessels.

In order to be able to take advantage of lower operating costs through operating efficiency which is offered by these vessel types, ship operators take great care to obtain optimal ship designs. The ship design criteria take into account several variables including cargo potential, ports to be served, frequency of calls required, length of route, competitive position of the operator on the route, other vessels serving the route, mini/landbridge connections etc. Taking cognizance of the door-to-door transport concept, it is important for ports to set up an overall transport system that satisfies operators' commercial needs.

Most ports in the developed and newly developed economies were able to envisage the general trend and expectations of maritime transport operators. They further acted quickly to provide port facilities for these emerging ship types, more often than not, in advance of the introduction of the traffic. Due to current route rationalization strategies of carriers, many of these ports have been able to obtain and retain a good share of traffic in their various regions. Singapore and Rotterdam may be cited as very good examples.

FIG.9

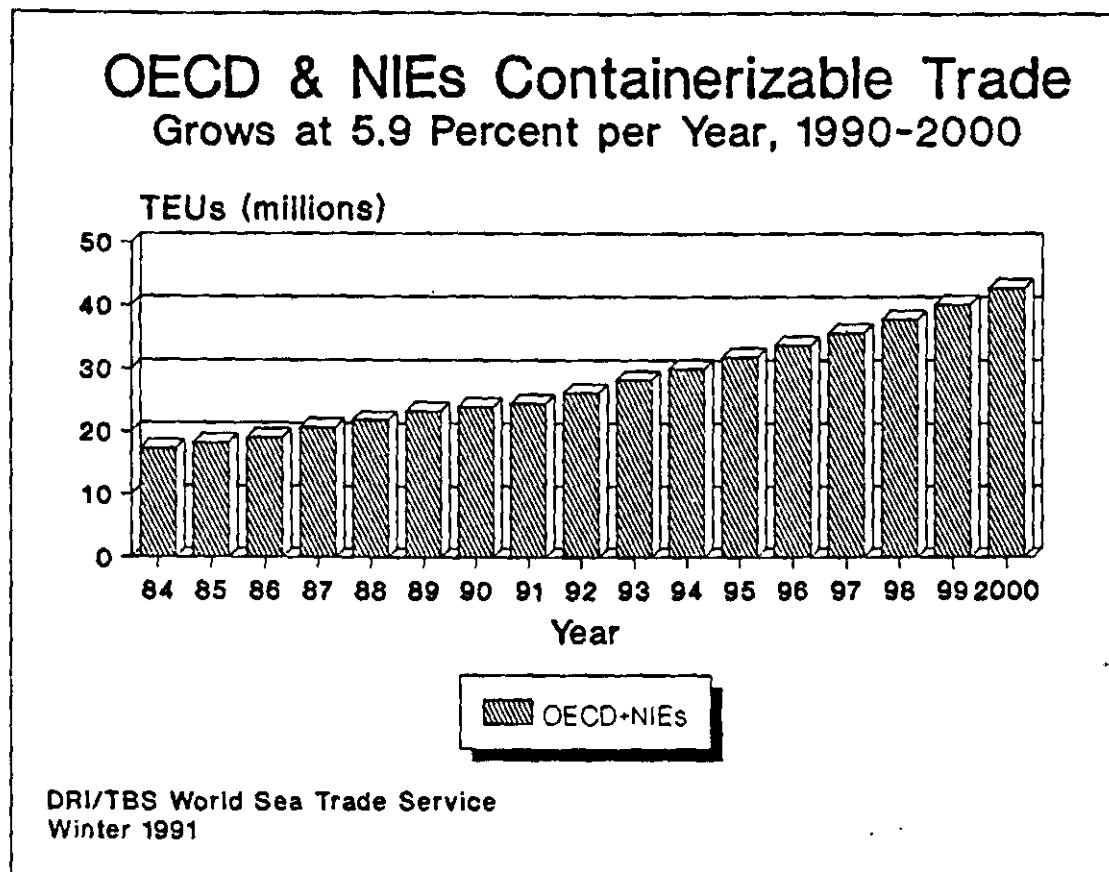
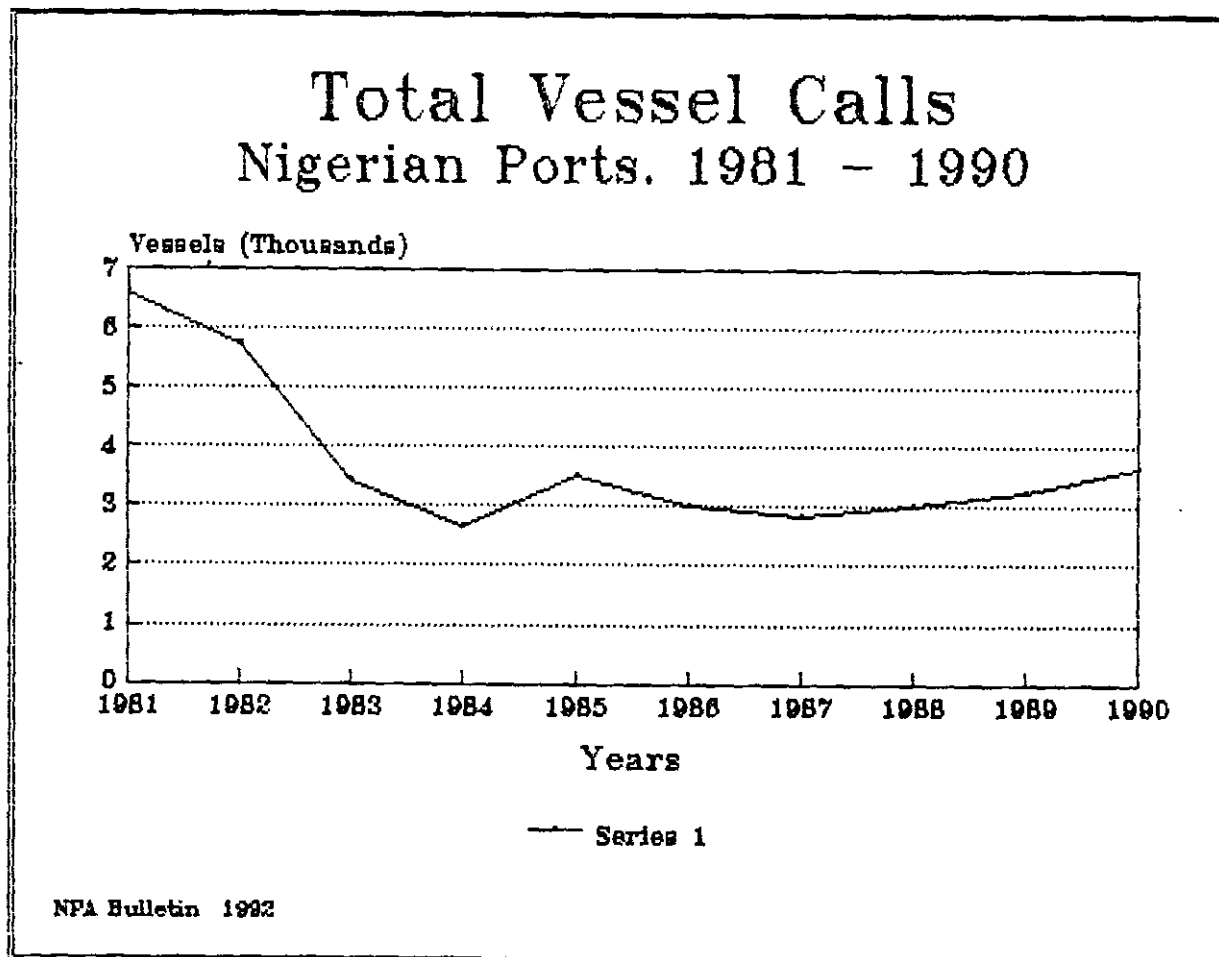


FIG.10



As far as shipping is concerned, there are basically two kinds of port users.

- a. Captive users. --- Those shipping companies that ship through a particular port because there is no alternative economic route and,
- b. Non-captive users. --- Those lines who move goods to a region through a particular port but who can decide to use an alternative port or mode of transport as a mini or landbridge. Alternatively, they may even decide to cease trading activity with the region or country.

This means that the policies of a port may cause diversion of traffic to other competing ports in the region or attract it.

According to Hazard, the most important factor which can affect the traffic of any particular port is to prevent the introduction of modern and more economic ship types.

(J L Hazard, 1987 p.56). This refers to a port's ability to provide the necessary infrastructural and superstructural requirements that would facilitate the reception and operation of modern ship types. These factors include draft, length, beam and port approach limitations which combine to determine the size of vessels that can call at the ports. It is therefore of utmost importance that a port knows the frequency and types of vessels that are calling and those that are likely to be introduced in the near future.

The table in Fig.10 shows the number of vessels that called at Nigerian ports for the years 1981 to 1990 (NPA statistics. 1992). These were made up of mainly bulk and conventional cargo vessels. The figures however do not indicate average

calls per day, week or month so as to expose any seasonal variations. Based on the available figures, it may be assumed that for the year 1990, the average calls per day (weekends excluded) was 14 vessels for all Nigerian ports including crude oil terminals. The vessel type distribution for the period was as follows.

Conventional carriers	6
Liquid bulk carriers	5
Dry bulk carriers	2.5
Container/Ro-Ro vessels	0.5

The low average for container/Ro-Ro does not mean that these vessel types do not call on the ports. It only reveals the low frequency of calls for these vessel types based on daily averages. Infact, Maersk Line operates weekly feeder services to Lagos with their Group C Type container vessels. The dominance of conventional vessels reflects the types of cargo moving through the ports and carriers' desire to carry return cargo some of which is non-containerized.

During the period under review, the dominant vessel types calling at the ports according to NPA statistics were the Freedom type vessels with the following characteristics based on averages.

Length overall	about	150m
Length B. P.	,,	140m
Breadth moulded	,,	20
Depth moulded to upper deck	,,	12
Summer draft	,,	10m
Dead weight	,,	18,000 tonnes
Gross tonnage		12,000
Net tonnage	,,	10,000

The better incentives offered by larger vessels through average capital/operating costs have resulted in the introduction of larger vessels with high operating speeds e.g. second generation container vessels of 50 - 60,000 DWT with average drafts of 13 metres. The results of this trend are that, firstly the draft limitations of some ports will affect vessel traffic to those ports. This is particularly the case of Nigerian ports with their maximum draft of 10.5 metres. Secondly, those ports affected by draft limitations will subsequently be relegated to the status of feeder ports and where facilities for land or minibridges do not exist, they may be forgotten completely.

The existing facilities in Nigerian ports in relation to vessel size limitations are:

Draft	10.5m	Apapa
	9.5m	Tin Can Island
	7.9m	Port Harcourt
	11.5m	Warri
Berth Length	250m	Apapa
	180m	Tin Can Island
	158m	Port Harcourt
	280m	Warri
Port Approaches	N.A.	

The above figures are a clear indication that Nigerian ports are unable to accept even second generation container vessels. Under these conditions, none of the ports is in position to assume the status of a hub port.

In a desperate attempt to capture traffic in a region or sub-region, ports may be tempted to provide infrastructure

and facilities in excess of actual requirements. It is important that Nigerian ports make their projected investments in close consultation with steamship lines using the ports. This will give the ports a better knowledge of actual and planned investments in vessel types by the steamship lines operating through the ports and subsequently the types and levels of services that will be required.

COMPETITIVENESS BY MARKET SEGMENTS

According to results of studies carried out by various experts, costs have been identified as the most important consideration for steamship lines and shippers in deciding which port to use. However, other factors are equally influential in the decision making process. These factors include but are not limited to location, market potential, service levels, facilities, working times, customs clearance procedures, legal/institutional factors, safety etc.

Due to the degree of importance placed on costs by steamship lines and shippers in deciding which port to use, the next chapter (Chapter 4) is dedicated to the analysis of the different cost components relevant to Nigerian and other competitor ports. For the purpose of this study, market segmentation will be based on a distinction between steamship lines and shippers. A further distinction will be made for the two categories based on captive and non-captive markets.

In order to determine steamship lines' and shippers' preferences, interviews were conducted with 10 liner shipping companies operating in Nigeria and other West African ports.

The results of the interviews indicate that apart from costs, port productivity with the resulting timely dispatch of vessels is of very high priority. Figures obtained from one of the steamship lines (Maersk Line) were used to analyse port productivity for 10 West African ports i.e. Abidjan, Apapa, Banjul, Conakry, Cotonou, Dakar, Freetown, Lome, Monrovia and Tema. The analysis concentrates on the major factors determining port productivity with particular regards to the object of the study. These are:

- Berth Productivity
- Work Productivity
- Gross Productivity and
- Net Productivity

In this section however, the analysis will concentrate on berth productivity as the other three factors are analysed in chapter 4.

The figures in Table.3 represent the berth productivity for the 10 ports analysed for the year 1991 and January --August 1992. The berth productivity is calculated on the basis of total container moves divided by total berth hours.

TOTAL MOVES / BERTH HOURS

Berth hours are based on the time frame from arrival of vessel at berth untill departure from the berth. Berth productivity is therefore an indication of the average container moves per berth hour.

Table. 3.

BERTH PRODUCTION FOR SELECTED WEST AFRICAN PORTS

	1991	1.Qtr	2.Qtr	1.Half Yr. -	01.08.92
Abidjan	17.00	23.70	20.30	21.70	21.20
Apapa	11.60	12.20	12.10	12.10	11.90
Banjul	10.70	9.80	10.40	10.10	10.20
Conakry	11.40	11.80	12.90	12.40	12.50
Cotonou	10.20	11.00	11.10	11.10	11.40
Dakar	12.60	12.70	14.10	13.40	13.70
Freetown	8.60	9.50	6.60	7.40	8.00
Lome	10.70	9.50	12.30	10.80	11.60
Monrovia	--	--	2.50	2.50	5.50
Tema	11.60	13.30	15.70	14.50	14.60

The results show average productivities of 10.44 for 1991 and 12.2 for January -- August 1992. For the port of Apapa (Nigeria), the average productivity for the same period was 11.6 for 1991 and 11.9 for 1992 respectively. This shows that the productivity of the Nigerian port increased marginally by 3 moves/hour over the period. In 1991, the Nigerian port's productivity of 11.6 was 1.16 moves/hour above the West African average of 10.44. This performance was however influenced by the lack of figures for the port of Monrovia during the period. For the period January to August 1992, the comparative figures show a decline of 0.3 moves/hour against its competitors. Against the port of Abidjan which has the highest productivity of 21.2 moves/hour, the figures for the Nigerian port are unimpressive.

If this is measured on the basis of an eight hour working day, the results will reveal that the productivity of the Nigerian port of Apapa is 2.4 moves less than the West African average and 74 moves/hour less than the port of Abidjan in one working day. These figures are very significant for steamship lines especially as regards non-captive markets. At the regional level, this indicates that the Nigerian port is uncompetitive. For captive markets however, the figures will become significant if there exists efficient land transport connections. Presently however, this segment of port users are relatively bound to the services of the existing ports.

The same assumptions may be applied to shippers. The relationship being that the faster the total transit time, the lower the inventory cost of goods shipped. The considerations for port choice as far as shippers are concerned does not stop at costs. Results of interviews held with shippers especially for non-captive markets revealed that security of goods was of equal importance. The non-captive markets considered were those of Niger and Chad. These countries ship their import and export cargoes mostly through the ports of Cotonou in Benin and Douala in Cameroon.

In order to establish this fact, a comparative analysis is made for route distances and land transit times between the competing ports and the seven major cargo centres in Niger. Niger was used for the analysis because of the ready availability of data. Table.4 shows the land distances from the port of Lagos, Cotonou and Lome to the seven major cargo centres in Niger Republic. The table reveals that Lagos has a distance advantage to six out of the seven cities. Even where it has a disadvantage i.e. to Niamey, the difference is marginal and of no real significance.

A further analysis is carried out in order to establish the transit times between these ports and Niamey, the capital of Niger Republic. This is because firstly, Lagos port already exhibits a locational advantage to the other cities, and secondly the capital city of Niger has a bigger market. The result obtained were as follows :

Table.4

Distance Comparisons between the competing ports.

	<u>NIAMEY</u>	<u>MODE</u>
Lagos	3 days	Rail/Road
Port-Harcourt	,,	,,
Lome	7 ,,	Road
Cotonou	10 days	Rail/road

Source: NITRA & NHRA, 1993.

This clearly shows the transit time advantage Nigerian ports have over their competitors for the non-captive markets. There were no data available in order to facilitate a risk analysis for the ports. However, the above findings are a clear indication that shippers in these markets may not be satisfied with other service standards at Nigerian ports. Another explanation may be that of language difference between the two countries. These assumptions may however become clearer when total costs are analysed in Chapter 4.

CARGO FORECASTS

Having established that Nigerian ports have a locational advantage over the neighbouring ports for transit cargo, it is important to carry out a cargo forecast. This is intended to provide a fair picture of the possible future traffic that the ports may expect to handle if they are able to win these markets.

In carrying out the forecast, it is recognized that several events may act to influence the rate of growth or decline. These include political changes, industrial growth, growth in the national economy, changes in the principal price of commodities, GNP, changes in the global economy etc. For the purpose of this study however, it is assumed that all the other variables will remain constant. This is particularly due to the lack of data for those variables. It is further recognized that the past is not always a reliable guide to the future. It is however much better to make projections which will form the basis for the effective monitoring of future events. Any deviations from the projected figures will then serve as a warning sign to the management of the ports as to the direction of future events.

There are several mathematical methods which can be used in making these forecasts. They include multiple regressions, demand elasticity estimations, least squares fit etc. As stated earlier on, the lack of figures for the independent variables makes it difficult to analyse any possible effects that they may have on the future demand pattern. Consequently, a simple computer based trend extrapolation based on the historic time series is employed.

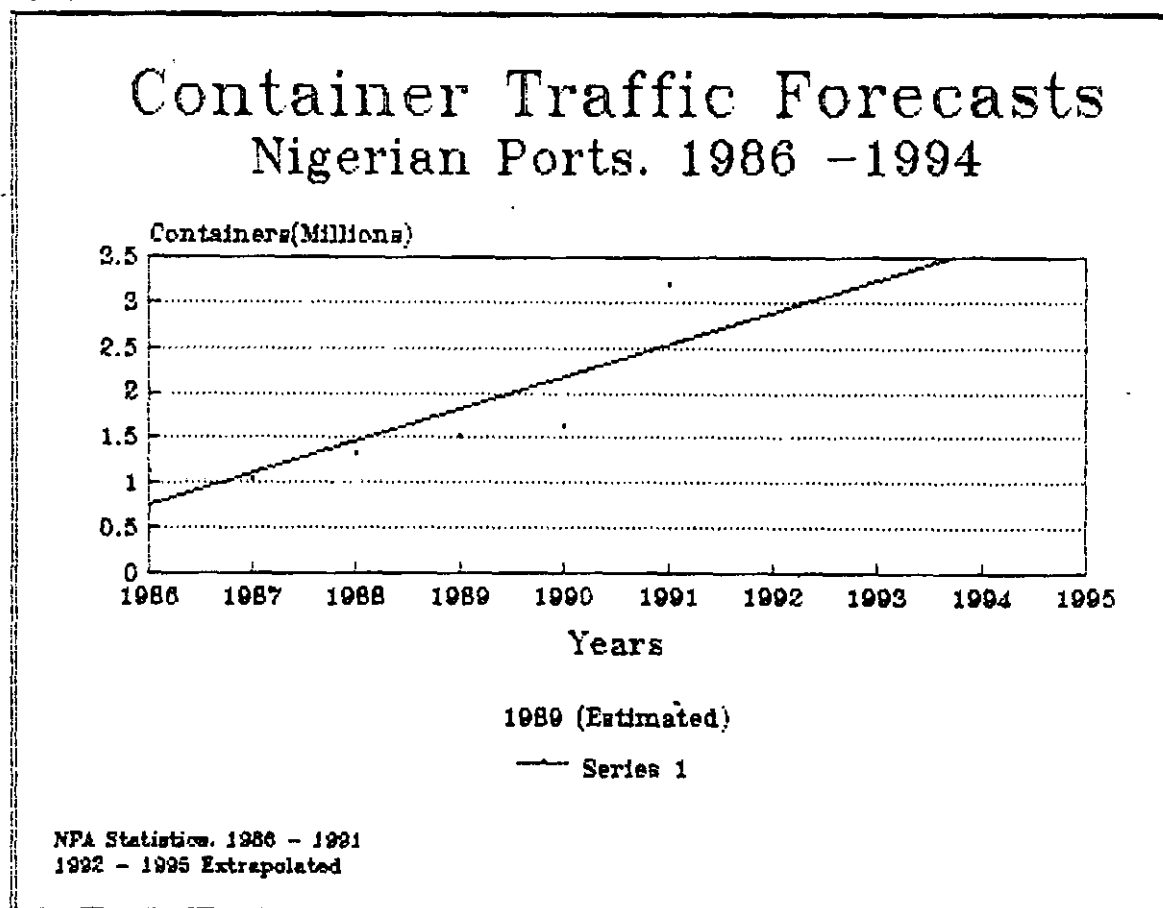
Fig. 11 shows the trend for containerized and containerizable cargo for captive markets for the period 1987 - 1991. A further forecast for the non-captive market of Niger Republic is given in Fig. 12.

The results reveal that about 23 million metric tons of captive cargo excluding liquid bulk may be handled by the ports in 1995. For the non-captive market, a throughput of about 700,000 tons for the same period may be possible.

In Fig.13, the same trend extrapolation method based on the historical time series is used to forecast container traffic up to 1994. The results show that about 3.5 million TEUs will be moved through the ports in 1994, about 10 percent above the 1991 figures.

The results obtained can then be used to determine the level, types and numbers of handling equipment, stacking space and other logistics requirements by the ports. As indicated earlier, the various independent variables and seasonal variations have not been analysed, and these can affect the results either positively or negatively.

FIG.13



CHAPTER 4

COMPETITIVE COST/PERFORMANCE ANALYSIS

Unlike other industries, ports were protected in the past from the harsh economic realities of competition. As indicated in the previous chapter, this has now changed and basic economic forces are beginning to dictate decisions concerning cargo routes and port selection. In Chapter 3, it was indicated that costs constitute one of the most important factors influencing steamship lines and shipper's choice of ports. The costs here are not limited to port operations, but more importantly to the total chain of transport. This particular section of the study only looks at the costs from ship's tackle to consignee. This limitation of the cost consideration i.e. from port to consignee is based on the fact that ports do not have a direct influence on the cost of sea voyage. Their efficiency does however affect the total transport costs e.g. the benefits of removing delays to ships by improving ship's turnaround times or, the cost of increasing the delays by a port's inefficiency.

The study in this section further concentrates on costs related to standard charges. An attempt is made to analyse these costs for a standard ISO 20ft container. The aim is to compare the transit costs of transporting one 20ft container through Nigeria using Lagos against their competitors in Lome or Cotonou to Niger Republic, one of the non-captive markets. The analysis is based on a 15,000 GRT container vessel with carrying capacity of 700 TEUs (Twenty Foot Equivalent Units) for steamship lines and one TEU of an average weight of 18 tons FCL for shippers.

MARINE COSTS (Sea Transport)

In the not too distant past, ports used to compete on the basis of service advantage. Recently however, most port's service levels have become so similar thereby making any meaningful differentiation very difficult. Competitive considerations have therefore changed from service to cost advantage. This section looks at marine costs related to sea transport as they affect steamship lines. Based on the Nigerian Ports Authority (NPA) Dues and Rates Regulation 1993, the following results were obtained.

LIGHT DUES

Vessels exceeding 500 Grt = 1.36 USD/ton/grt per
voyage = $1.36 * 15,000 = 20,400$ USD.

CONSERVANCY DUES

Foreign Trade Vessels = 1.10 USD per ton of grt
 $1.10 * 15,000 = 16,500 * 2 = 33,000$ USD.

BERTHING DUES

Standard = 151.80 USD

PILOTAGE

0.084 USD per grt = $0.084 * 15,000 = 1,260$ USD

MOORING DUES

0.77 USD per grt per period for first 10 days
 $0.77 * 15,000 = 11,550$ USD.

TOTAL MARINE COSTS =

$20,400 + 33,000 + 151.80 + 1,260 + 11,550 =$
 $66,361.80$ USD.

For the port of Cotonou, the tariffs are quoted in the CFA Franc. These are converted based on the current exchange rate of 270 CFA = 1 USD. The rates are further charged per cubic metre using the formula

Length * Breadth * Draft.

Taking the freedom type vessel of 15000 GRT given in Chapter 3, this works out to $140 * 20 * 10 = 28,000$ cubic metres.

LIGHT DUES Not available

CONSERVANCY DUES Not available

HARBOUR DUES

$= 50,000/\text{day} * 11 / 270 = 2037.04 \text{ USD}$

PILOTAGE

$= 1.8/\text{cm} * 28,000 * 2 / 270 = 373.33 \text{ USD}$

MOORING DUES

$= 40,000/\text{visit} / 270 = 148.15 \text{ USD}$

SECURITY

$= 11,200 * 11 \text{ days} / 270 = 456.3 \text{ USD}$

TOWAGE

$= 3.3/\text{cm} * 28,000 / 270 = 342.2 \text{ USD}$

TOTAL VESSEL CHARGES

$= 2037.04 + 373.33 + 148.15 + 456.3 = 3014.82 \text{ USD}$

Due to the lack of data for Light and Conservancy dues, the comparison was made only for those functions with available data. The figures show a marked difference in marine costs between the two ports, i.e. 12,961.80 for Lagos and 3,014 for Cotonou. For steamship lines, the costs for Nigerian ports are prohibitive. This means that, with efficient inland transport connections, most steamship lines would prefer to make mini-bridge connections to Nigerian markets through the port of Cotonou.

TERMINAL HANDLING AND TRANSFER COSTS

The rates quoted by the NPA in Nigerian currency (Naira) are converted into Dollars based on the current exchange rate of 18.5 Naira = 1 USD. The estimates are further calculated based on charges for import cargoes per 20ft container of 18 tons weight.

Wharfinger	=	171.60	/	18.5	=	9.3 USD
Wharfage	=	9.18/ton * 18	/	18.5	=	8.93 USD
Stevedoring	=	50 USD				
Port Rail Charges	=	4.5/ton * 18	/	18.5	=	4.4 USD
Shore Handling	=	88	/	18.5	=	4.75 USD
Trnasfer Charge	=	300	/	18.5	=	16.2 USD
Terminal Delivery	=	280	/	18.5	=	36.09 USD

Total Port Associated ~~Costs~~ (Lagos) = 108.72 USD

For the port of Cotonou, the published cargo tarrifs for 1993 are given bellow.

Port dues	=	CFA 1700/ton * 18	/	270	=	113.33 USD
Discharging	=	1000/ton * 18	/	270	=	66.67 USD
Total Port Associated Charges (Cotonou)	=	180 USD				

INLAND TRANSPORT COSTS.

Inland transport costs are calculated on the basis of rail and road haulage charges per container from Lagos to the furthestmost Inland Container Depot (ICD) in Kano which also has the biggest regional traffic concentration after Lagos.

Further, the total inland costs to the Republic of Niger, the non-captive market are calculated.

Table 5. shows the comparative costs of inland transportation including handling charges from the two competing ports under consideration. As with the distances earlier analysed, the Nigerian port exhibits a comparative advantage over Cotonou for inland transport charges.

In the next section, total transport costs will be analysed and compared for the two ports in order to establish which of them has a total transport cost advantage.

Table 5. Inland Transport Cost Comparisons (In USD).

Route	Mode	Cost USD	Handling Charges	Total
Lagos - Kano	Rail	973.00	31.16	1004.16
Kano - Niamey	Road	380.00	32.4	412.40
Lagos - Niamey	Rail/Road	1353.00	63.56	1416.56
Cotonou - Niamey	Rail/Road	484,000 Incl.		1792.60

Sources: NRC, NITRA & NRHA, 1993.

TOTAL TRANSPORT COSTS

In the preceeding sections, various cost components were analysed. This is intended to show the relative strengths and weaknesses of Nigerian ports in the various activities in

relation to their competitors. The results can then be used in decision making regarding the types of activities that need adjustment if they wish to remain competitive. According to R. E. Holden, the primary criterion in port selection by all port users is the total point-to-point cost of shipping through them. (R E Holden, 1993 p.33).

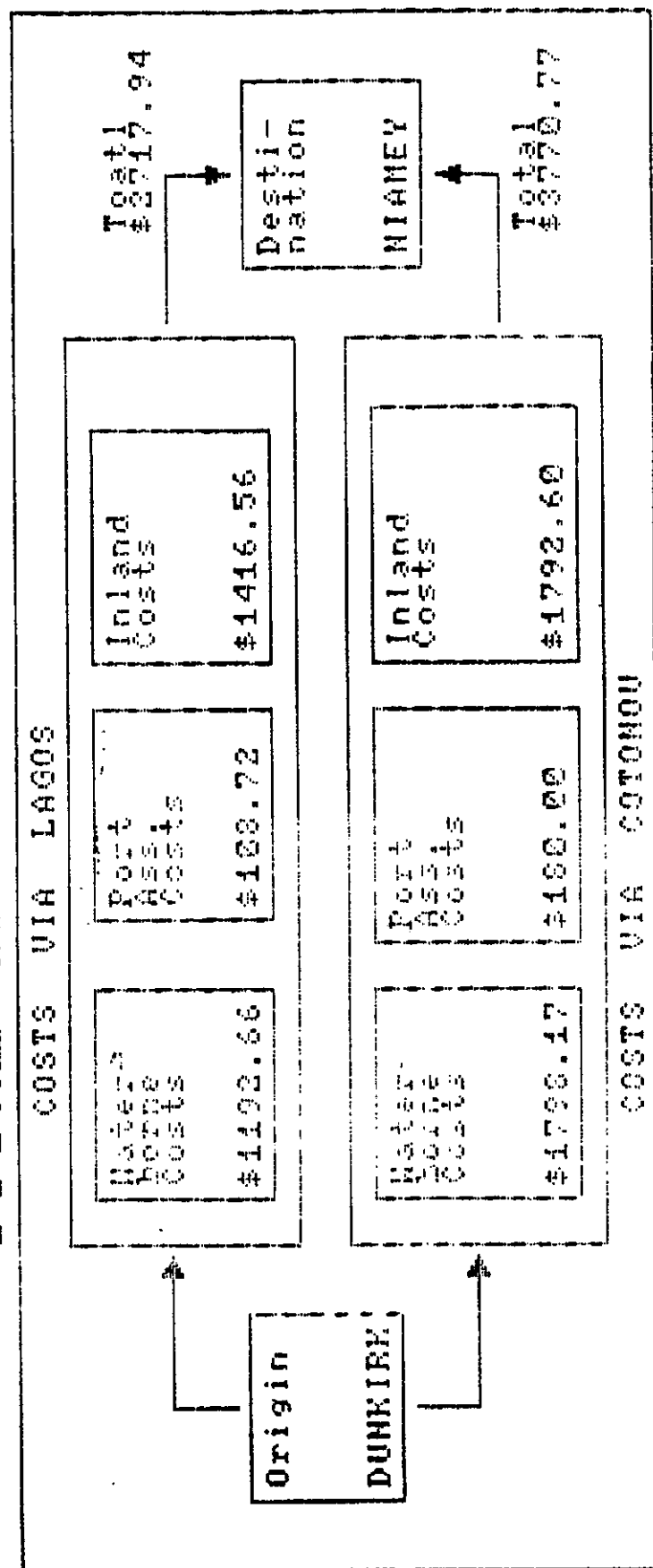
In this section, total transport costs are analysed for the shipment of one TEU of 18 tons from point-to-point. For this study, Dunkirk - Niamey is used for the analysis. The costs being considered here are waterborne costs, port associated costs and inland transport costs.

As stated earlier, ports have little control over waterborne and inland transport costs. But their analysis can be used to produce useful indicators of the trade routes and inland cargo market centres in which they may be competitive.

FIG. 14 gives a summary of the comparative total transport costs between the ports of Lagos and Cotonou. The assumption made here is that two TEUs laden with Completely Knocked Down (CKD) auto parts are shipped from Dunkirk to Niamey. They are loaded on the same vessel. One container is routed through the port of Lagos and the other through the port of Cotonou. The waterborne costs are based on the 1993 freight tariffs quoted by Delmas Shipping Line, one of the major liner companies operating in the region. The rates are quoted in the European Currency Unit (ECU) and conversions are based on the current exchange rate of ECU 1.090 = 1 USD (Financial Times, August 2 1993).

FIG.14

TOTAL TRANSPORT COSTS



Waterborne costs

(Lagos) = ECU 1300/TEU / 1.090 = 1192.66 USD

(Cotonou) = ECU 1960/TEU / 1.090 = 1798.17 USD

Table 6 gives the container shipping cost comparisons for the two ports for the shipment of one TEU of 18 tons weight.

Table 6. Total Transport Cost Comparisons

<u>Cost Element</u>	<u>Lagos</u>	<u>Cotonou</u>
Waterborne Costs	1192.66	1798.17
Port Associated Costs	108.72	180.00
Inland Costs	<u>1000.00</u>	<u>1792.60</u>
Total	2308.38	3770.77

PORT PRODUCTIVITY

It has long been established in maritime transport studies that the overall efficiency of ships in performing a service is closely related to the time spent in that service. The more time a ship spends in port for loading and discharging, the less time it has to move cargo from point to point within a given period. For steamship lines and shippers alike, the work productivity in a port can directly affect their customers' service levels e.g. schedules for steamship lines and on-time deliveries for shippers.

One important input for efficient cargo operations which is often overlooked by ports in developing countries is the labour force dealing with the cargo. In this section, an attempt will be made to analyse the three inputs which can affect the overall efficiency of a port, i.e. Work Production, Gross Production and Net Production. Overall performance figures for the 10 West African ports under consideration are further used to compare with the

performance of some selected European ports. The intention is not to find out why some ports are performing better than others, but rather to establish the fact that there are marked differences and that these differences can in fact influence users' choice of the ports.

Table 7 gives the average work production figures for 10 West African ports for the periods January - December 1991 and January - August 1992. The work production is calculated as total moves divided by total work hours.

TOTAL MOVES / TOTAL WORK HOURS

Work hours are defined as the time frame from when work is commenced to when work is completed. Work production therefore shows the average container moves per work hour per crane. The figures reveal Abidjan as being the most productive port in West Africa as far as work production is concerned. The figures further reveal that the Nigerian port of Apapa is operating below the productivity of its competitor, Cotonou port.

Table 7.

WORK PRODUCTIVITY FOR SELECTED WEST AFRICAN PORTS

	1991	1.Qtr	2.Qtr	1.Half Yr.--	01.08.92
Abidjan	20.90	26.70	23.40	24.80	24.80
Apapa	12.80	12.80	12.50	12.60	12.30
Banjul	12.30	10.50	11.60	11.10	11.70
Conakry	13.70	12.50	13.50	13.10	13.20
Cotonou	12.20	12.30	12.80	12.50	13.00
Dakar	14.90	17.80	16.20	16.90	17.30
Freetown	9.00	10.10	9.70	9.80	10.40
Lome	12.00	10.50	13.70	12.00	12.80
Monrovia	--	--	3.60	3.60	7.70
Tema	13.20	13.90	17.00	15.40	14.20

Source: Maersk Line Statistics, 1992.

In Table 8, the Gross Production figures for the 10 ports are given for the same period. The gross production is calculated as total moves divided by total gross hours.

TOTAL MOVES / GROSS HOURS

Gross hours here is defined as total gang hours minus all relevant deductions. e.g. standby time, heavy lift time, etc. The gross production therefore shows the average moves per gross hour per crane. The analysis also reveals that Apapa port is performing far below its competitor for gross production.

Table 8.

GROSS PRODUCTION FOR SELECTED WEST AFRICAN PORTS

	1991	1.QTR	2.QTR	1.HALF YR.	- 01.08.92
Abidjan	12.30	15.10	14.20	14.60	14.50
Apapa	6.00	6.70	7.00	6.80	6.70
Banjul	6.70	6.60	6.80	6.70	7.40
Conakry	8.20	7.90	9.30	8.70	9.30
Cotonou	9.80	12.10	12.40	12.20	12.60
Dakar	9.50	11.90	12.90	12.40	12.30
Freetown	5.40	6.00	7.70	7.00	7.40
Lome	8.60	10.40	13.70	12.00	12.80
Monrovia	--	--	2.80	2.80	5.80
Tema	7.40	8.50	10.20	9.30	9.10

Source: Maersk Line Statistics, 1992.

In Table 9, the Net Production is worked out on the same formula as the work and gross productions. i.e.

TOTAL MOVES / NET HOURS

where net hours is the total gross hours of work minus all deductions including break periods. The net production therefore shows the average moves per net hour per crane.

Table 9.

NET PRODUCTION FOR SELECTED WEST AFRICAN PORTS

	1991	1.QTR	2.QTR	1.HALF YR. - 01.08.92	
Abidjan	13.80	17.50	16.70	17.10	16.90
Apapa	8.50	9.20	11.10	10.10	10.00
Banjul	9.30	9.20	9.70	9.50	10.50
Conakry	8.90	8.50	9.70	9.20	9.90
Cotonou	11.90	14.40	17.50	15.80	16.40
Dakar	11.50	14.10	15.40	14.80	14.80
Freetown	5.80	6.00	9.10	7.70	8.10
Lome	9.60	12.30	14.60	13.40	14.10
Monrovia	--	--	2.80	2.80	5.90
Tema	9.30	8.50	10.90	9.60	9.70

Source: Maersk Line Statistics, 1992.

As in the cases of Work and Gross production, Apapa port is uncompetitive against the port of Cotonou. In all cases considered so far, the port of Abidjan seems to exhibit considerable advantages against its competitors in the whole sub-region. Even against some European ports, the port of Abidjan compares relatively well. See Table 10.

Contrary to assumptions made earlier on when other factors were analysed, these findings are of much significance for steamship lines and shippers alike. From the findings, the following assumptions may be made:

- a. The other ports may be operating with better equipment
- b. Better trained and motivated staff and

- c. More committed to higher service levels to their customers.

If the above assumptions are anything to go by, then any marginal cost differential is not likely to divert traffic from the competitor ports to the Nigerian port.

Table 10.

OVERALL PERFORMANCE FOR SELECTED PORTS

	1989	1990	1991
	Throughput per hour	Throughput per hour	Throughput per hour
Hamburg	26.00	27.00	31.00
Amsterdam	25.00	21.00	28.00
Rotterdam	29.00	20.00	26.00
Le Havre	29.00	26.00	31.00
Lisbon	16.00	17.00	19.00
Abidjan	22.00	19.00	22.00

Source: Maersk Line Statistics, 1992.

PORT SAFETY STANDARDS

The safety under consideration here is cargo safety. Obviously, it is of primary concern both for steamship lines and shippers that goods are delivered on time and in safe condition. Since loss or damage more often than not takes

place at intermediary points, it is important that ports maintain a very high profile in their safety standards.

Though there are no loss/damage data for the ports under consideration, one obvious way of keeping a constant check on a port's loss or damage rate is to keep accurate accounts of all losses or damages occurring within the port for any given period of time. These figures should then be used to calculate the average rate of loss/damage over the period. Any deviation from the set standard or previous levels will serve as an indicator to management as to the direction of their safety standards vis-a-vis their competitors. Where the results obtained are positive, this can further serve as a marketing tool and a reassurance to customers regarding the safety of their cargo through the port.

CHAPTER 5

DEVELOPMENT OF MULTIMODAL / INTERMODAL FACILITIES

Having established the strenghts and weaknesses of Nigeria's ports in relation to their competitors for the port operations functions, it is necessary to consider other external factors that can influence the ports' competitiveness. As already observed in the previous chapters, the container is an integral part of the modern container vessel. This means that with the transport of containers into hinterlands, the container vessel does not only reach the port now, but also the hinterland. Consequently, some port functions have also been moved to the hinterland.

The fact that the cargoes are being transported inland means ✓
that shipowners' interests in cargo do not finish when the ↓
cargo is discharged from the vessel. Shipowners normally
take responsibility for cargo which only terminates on
delivery of the cargo at the consignee's premises or
warehouse. This means that shipowners have to take into
account the total service package that a port is able to
offer along with the infrastructure and the connecting
transport system. Based on this package offered by the port,
a shipowner will then offer his own transport package to his
customers. For this reason, the quality of service offered
by a port including the connecting transport systems does not
only directly affect the competitiveness of a port, but it
does directly affect that of the shipowner as well.
Therefore, the ports have to offer more than a berth and
other loading and discharging facilities. Now as more than

ever before, ports have to get deeply involved in matters which are sometimes only indirectly related to the port's operation. ↑

PORT / LAND INTERFACE

It has become common commercial practice since the introduction of containers that any port which is not accessible to a major rail system is seriously handicapped in competing for intermodal traffic. As if this is not enough, distances of rail terminals from ports has become of such major significance to the extent that even a few kilometres in favour of one port over another can prove to be decisive.

The main reasons for the heavy reliance on rail services in international intermodal transportation are that, the efficient use of block train services can serve to decongest ports. Secondly, a break even cost analysis for road and rail in different countries show that rail transport is preferred for distances beyond a certain limit. In Germany for instance according to Henderson, the break even point between road and rail transportation lies at a radius of about 170 - 250 kilometres from the port (Anthony M.S.Henderson, 1993 p.7). This figure may be taken as a standard for Europe. In the United States, the distance is said to be slightly higher. This is as a result of the high performance standards of American trucking companies and the inefficiency of the rail system. In Nigeria, the break even distance is given as 300 - 400 kilometres from the ocean terminals (Falola and Olanrewaju, 1978 p.74)

One of the advantages the Nigerian ports have for intermodal transportation is the existence of rail sidings leading directly to the quay sides and container terminals. With proper coordination, the existence of this infrastructure could play a vital role for the ports as well as the Railway Corporation. It would help direct traffic from road to rail thereby reducing the overall transport costs for long hauls. This is environmentally sound as it would consequently reduce the number of heavy trucks on roads and thus damage to roads and environmental pollution. For the ports, an efficient integration of port/rail services is a prerequisite for winning intermodal traffic for the non-captive markets.

LEGAL / INSTITUTIONAL REQUIREMENTS

In the preceeding sections, the commercial possibilities for intermodalism were analysed. These possibilities can only be converted into realities with the aid of appropriate legal and administrative arrangements. For international transactions, several bodies within the United Nations system are working relentlessly towards the simplification and harmonization of legal and administrative requirements. In this section, efforts will be made to consider some of the activities and the relevant international instruments that may be employed in Nigeria for the aforementioned reasons.

THE MULTIMODAL TRANSPORT (MT) CONVENTION

According to the United Nations Convention on the International Multimodal Transport of Goods (the MT Convention), multimodal transport is:

"... the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country."

The main thrust of the convention is the unification of the multitude of liability systems in use for combined or multimodal transport. This means that:

- a. One principal, known as the Multimodal Transport Operator (MTO) is liable throughout the entire transport operation.
- b. The MTO acts as the principal for the whole transport activity.
- c. The shipper is issued one single negotiable or non-negotiable MT Document which covers the whole operation.

If this document is viewed in to segmented transport, where the shipper has to claim against individual carriers who he does not know in most cases, the MT Convention is probably one of the best instruments on the international transport of goods.

CUSTOMS PROCEDURES

Due to the on-time delivery requirement for the transportation of international consignments, the streamlining of Customs procedures has become very essential

for fast container movements. In Nigeria as in most other developing countries, Customs is one of those important areas where a country's government can give considerable impetus to smooth container transport.

The aim of international multimodal/intermodal transport arrangements is to reduce total transit times and costs. However, if the existing customs procedures in developing countries are not improved and simplified, the potential advantages of intermodalism will not be realised. This is of particular interest to developing countries because it improves efficiency and cuts costs without the requirement of any capital investment.

In developed countries on the main container routes, steps have been taken to reduce Customs formalities to the barest minimum, and in most cases, all containers move inland for clearance. In the port of Aarhus, Denmark for instance, it takes just a couple of minutes to obtain Customs clearance for a container. On average, the total activities for the clearance of a container takes about 2 hours. The same activities take an average of 10 days in Nigeria. In most cases, all boxes are opened for inspections at the port. This system constitutes a major obstacle to door-to-door container operations.

In Europe, Customs problems affecting transit have been solved through the ratification of multilateral conventions. Developing countries on the other hand depend mostly on bilateral or sub-regional agreements which turn out to be ineffective in most cases. One classic example is between Nigeria and Niger Republic who negotiated a bilateral agreement on transit of cargo. Presently however, this

arrangement is non-operational. An interview with Customs officials in both countries revealed that they were ignorant of the existence of this arrangement. This serves to reinforce my earlier statement and further gives credence to the importance of international conventions which are statutory and much more easily enforceable by the parties.

Several attempts have been made by the international community to simplify Customs formalities which constitute barriers to trade. If developing countries including Nigeria wish to remain relevant in international trade, it is necessary to look at some of these instruments with a view to implementation.

Convention on Transit Trade of Land-Locked States, 1965.

This convention embodies the principle of the freedom of the High Seas for land-locked states. It requires coastal states to allow ships of their land-locked neighbours equal treatment as their vessels as far as the access to and use of seaports is concerned. Goods in transit are not subject to duty, however, charges for the expenses of supervision and administration may be levied.

Customs Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention).

This convention was originally an agreement drawn up under the aegis of the Economic Commission for Europe (ECE) in 1949. Its success later led to the negotiation of the TIR (Transport International Routiere) convention in 1959. The main objective of the convention is to ensure that goods travel internationally with the minimum of interference

enroute and still offer adequate safeguards to Customs administrations in all countries where the goods may transit.

Under the provisions of the convention, goods are to be carried in containers or in vehicles whose load compartments can not be accessed from outside when secured by customs seal. Further, due to the mechanisms used, the results of any tampering will be clearly visible. The convention contains four basic requirements:

- a. that goods should travel in secure vehicles or containers.
- b. that duties and taxes at risk should throughout the journey be covered by an internationally valid guarantee.
- c. that the goods should be accompanied by an internationally accepted carnet taken into use in the country of departure and serving as a control document in the countries of despatch, transit and destination.

Customs Convention on Containers.

Like the TIR convention, this convention was originated by the ECE countries and later extended to worldwide application in 1972. The convention is administered by the Customs Cooperation Council, and its main objective is to facilitate the use of containers in international traffic.

International Convention on the Simplification and Harmonization of Customs Procedures (The Kyoto Convention 1973).

This convention is based on the premises that the simplification of Customs procedures will lead to a reduction in the number of documents required and thus reduce the total costs of exports and imports. In negotiating the convention, it was further recognised that the existing divergencies in Customs procedures can hamper international trade. The convention is in two parts:

- a. The first part sets out the scope, structure, administration, accession and amendment procedures.
- b. The second part has a set of 30 Annexes, each dealing with a separate customs procedure.

The objective is for the universal application of relatively simple, standard customs provisions for the development and enhancement of world trade.

INLAND INFRASTRUCTURE

As competition for traffic stiffens, so does the pressure on ports as they continue to upgrade the quality and types of services they can offer. According to Holden for example, expenditures on terminals for 16 major United States ports are estimated at 3.7 billion U.S. Dollars over the next five year period (R E Holden 1989 p.36). Notwithstanding this fact, it must be noted that excellent facilities alone may not necessarily attract traffic to a port. However, this happens to be one of the most important and common activities being undertaken by ports in recent times. Some major ports

have successfully used cooperative planning in designing their facilities by working with steamship lines, railroads and trucking companies to set up cargo networks. One example is the container terminal developed by the port of Aarhus, Denmark in concert with the Danish Railroads, Steamship Lines, Stevedoring and Trucking companies. As observed earlier on, facility design is aimed at reducing the number of handlings and total transport costs.

Railways

Like the ports, railways are now facing new demands to accommodate the recent developments in intermodal transportation. In the United States, double stack trains have been introduced, while in Europe block trains are being extensively employed for long haul container transportation. Though these systems are yet to be introduced in Nigeria, there are possibilities for the introduction of block trains from the ports to some of the regional cargo centres.

As far as equipment is concerned, the rail track guage of 2.5 feet in Nigeria should not constitute a limiting factor for container transportation. Containers can be carried on narrow or wide guage tracks as long as the railcar profile is wide enough to accommodate containers. Information on maximum axle load restrictions for Nigerian Railways is not available. However, if such a limiting factor or restriction exists, it can be rectified by increasing the number of axles per wagon of a given weight. For a developing country like Nigeria, this may serve to minimize the amount of investment that would otherwise be required for new infrastructure.

Road Transport.

There are no specific requirements for the carriage of containers by road in Nigeria. The available restrictions are more or less the same as those for all heavy duty vehicles. The only limitations that may apply specifically to container transport are those dealing with permissible heights and axle loads. However, with growing container heights and increasing weights, the existing lateral clearance of overhead bridges and passes needs to be reassessed. There are however some possibilities for avoiding these bottle-necks. They include but are not limited to:

- a. Traffic regulation
- b. Construction of new bridges
- c. Re-routing of heavy traffic
- d. Strengthening of existing bridge constructions.

Though neither the ports nor hauliers can directly effect these changes, they can use their economic and political clout to influence government in taking adequate action.

Inland Waterways

The transport of containers by inland waterways requires that the waterways remain navigable all year round. Unfortunately, the two major rivers in Nigeria (Benue and Niger) are navigable on an average of four months in a year. The remedy available here would be to dredge the two rivers over a collective distance of about two thousand kilometres. Additionally, inland container terminals will have to be constructed. However, it must be realised that the provision of capital intensive infrastructure whose utilization is less than 10% is uneconomic. According to

UNCTAD studies, the minimum output that may justify the construction of an inland container terminal is 3,000 TEUs per annum (UNCTAD Multimodal Transport Handbook 1993 p.102). Considering the characteristics of the Nigerian rivers as enumerated above, inland waterway container transportation is not a viable alternative presently.

Though dredging of the rivers may increase the amount of traffic and consequently utilization, the objective of this study is mainly to consider the better utilization of existing facilities and where necessary, minimal investment for performance improvement.

Inland Clearance Depots (ICDs).

Inland clearance depots are sometimes referred to as Dry Ports. ICDs promote and facilitate intermodalism as ports are being brought closer to consignors and consignees. They further serve to decongest ports. The UNCTAD Handbook on Multimodal Transport describes ICDs as

" A common-user inland facility, other than a port or an airport, with public authority status, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods (including containers) carried under Customs transit by any applicable mode of inland surface transport, placed under Customs control and with Customs and other agencies competent to clear goods for home use, warehousing, temporary admission, re-export, temporary storage for onward transit and outright export".

In addition to the facilitation of intermodalism, ICDs act to

stimulate industrial and commercial activities in the hinterlands where they are located. This consequently leads to additional employment and income opportunities for those regions. These benefits will however depend on the efficacy of the ICDs themselves. That is to say that the primary functions of the ICDs are being performed. i.e.:

Customs Clearance

Consolidation of LCL cargoes

Transfer of containers between various modes

Positioning of containers

Temporary storage facilities for containers and other cargoes

Stuffing and stripping of containers

Container maintenance and repair facilities.

There are presently two Inland Clearance Depots in Nigeria. One in Kaduna, the north central part of the country and the other in Kano, the extreme northern part of the country in close proximity to Niger Republic. This places Nigerian ports in an advantageous position to capture the non-captive markets of Niger Republic. However, there appears to be some structural deficiencies affecting the ICDs.

- a. They are owned by private operators who have no public authority status contrary to the UNCTAD definition of ICDs.
- b. They are not owned by the ports nor Railways Corporation. This makes it difficult for the ports to delegate their public service functions including security of cargo to the ICD operators.
- c. In view of the structural deficiency of the ICDs, they are seriously limited by their ability to

provide some of those functions expected of an ICD.

- d. Taking cognizance of its status, it is difficult for the Customs department to delegate their public responsibilities to the ICDs.

As far as equipment is concerned, their requirements are no different from those of the ports with very little variations in the types employed. Their numbers, capacities and performance should be related to the expected cargo throughput of the ICDs. As indicated earlier however, there are no data for regional cargo distribution which can be used to forecast equipment requirements for the ICDs.

INFORMATION SYSTEMS

Having considered the different segments involved in the chain of transport, the remaining task is the integration of all these segments into a cohesive and logically linked system for optimum efficiency.

Given the stiffening competition in port traffic with the consequent gradual equalization of routine port services and costs, the emerging concept for competitive advantage is the introduction of integrated information systems for port users. Infact the application has been expanded to cover not only port users but all the parties involved in an international trade transaction. According to results of studies conducted by several experts, there are as many as 27 parties involved in the course of one international trade transaction, about 40 original documents and 360 copies relating to the transaction from order processing to final

payment. The main arguments against these traditional forms of documentation are that: It is too slow relative to the current increasing container vessel speeds, it is error prone and very expensive. About 30% of paperwork is related to transportation.

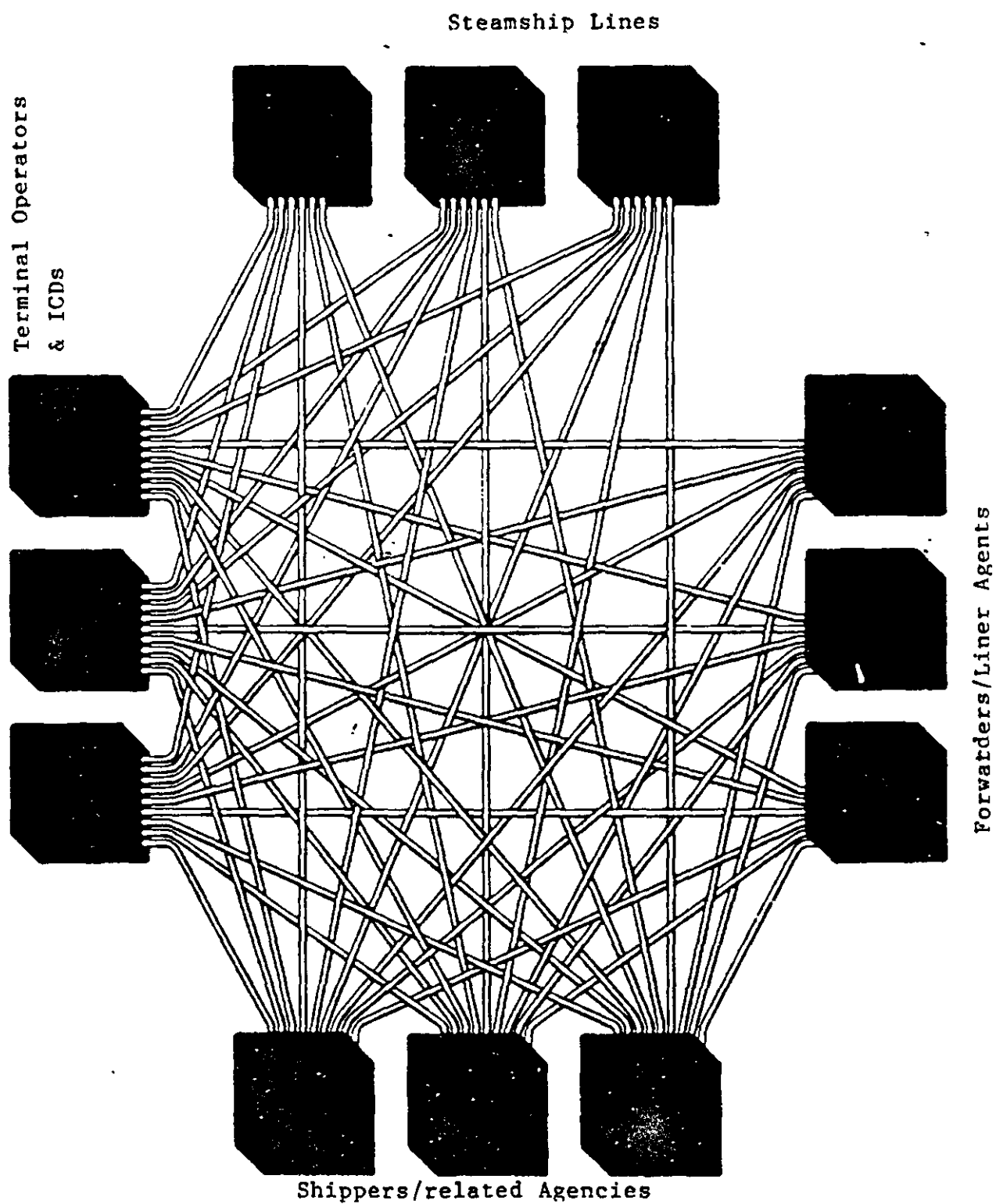
As stated earlier, the number of large and small companies involved in the total flow of information in Nigerian ports ranges anywhere between 500 and 1000. These include clearing and forwarding agents, stevedores, port agents, customs brokers, tally firms, ship brokers, liner agents, the port operators, haulage companies, etc. The existing maze of information flow between these organizations is represented by Fig. 15.

In an attempt to reduce total logistics costs, improve customer service and port efficiency, ports in developed countries have taken advantage of modern communication technology by introducing EDI (Electronic Data Interchange) systems. EDI is generally defined as the computer-to-computer transfer of information relating to commercial and administrative transactions using an agreed standard to structure the data pertaining to that transaction.

The most commonly held advantages of EDI according to the UNCTAD Handbook on Multimodal Transport are:

- a. It improves information management and data exchange within, and introduces new business strategies such as just-in-time manufacturing and delivery.

FIG. 15. EXISTING MAZE OF INFORMATION FLOW IN NIGERIAN PORTS

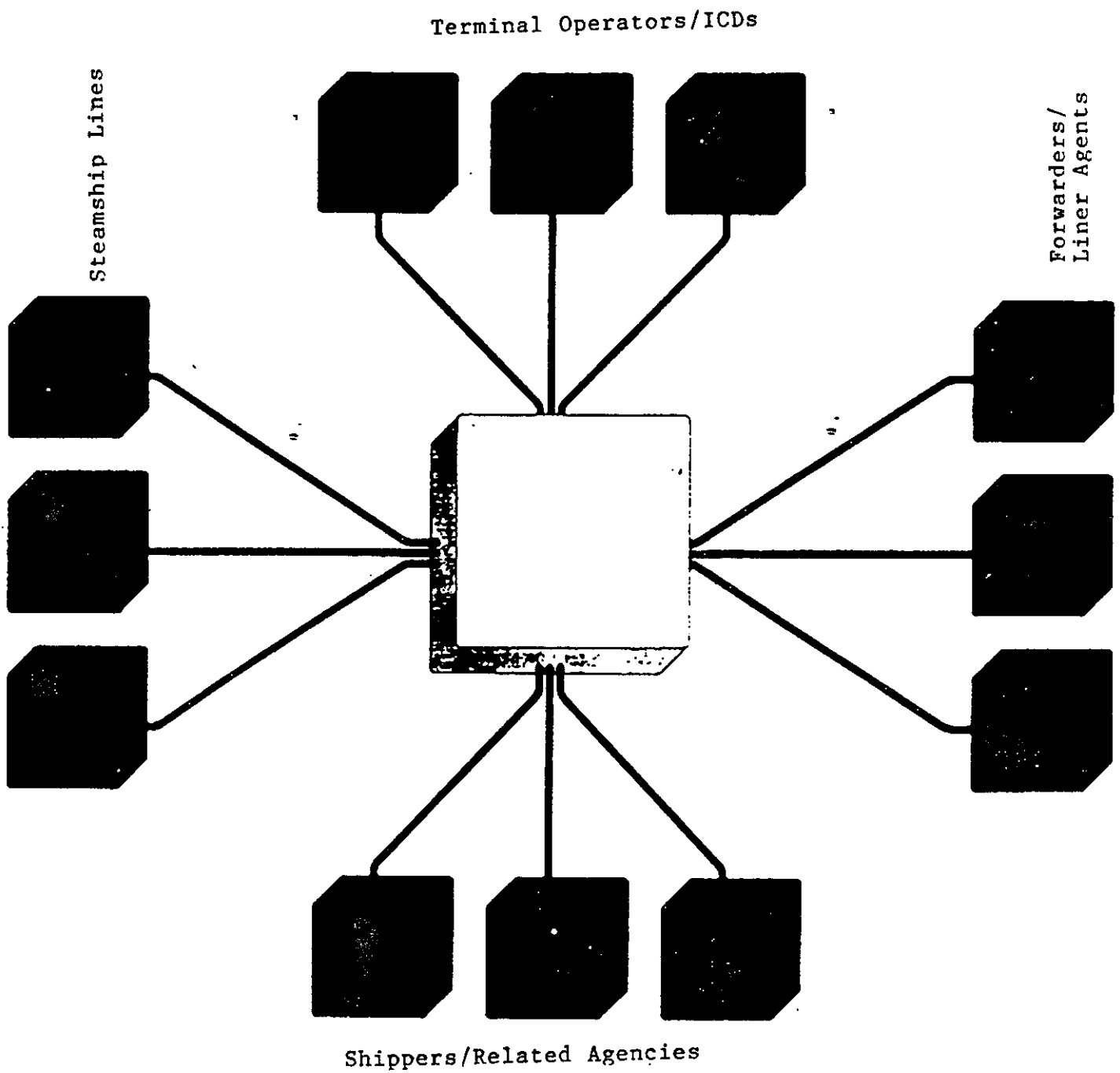


- b. It saves clerical costs by avoiding re-entry of data and allows timely and error free transaction of information to be passed from one computer to another.
- c. Allows quicker and safer processing of invoices to bring about speedy payment and thus improve cash flows.
- d. It facilitates and speeds up border controls and other official interventions such as Customs clearance.
- e. It is indisputably a new way of improving customer service while helping to reduce total logistics costs.

The type of port organization and cargo clearance difficulties in Nigeria particularly needs EDP (Electronic Data Processing) services. This is necessary so as to harmonize the flow of goods and data for a more efficient coordination of port related activities. It will further help to synchronize the activities of the ICDs, the ports, Customs, Steamship lines, Railways, Forwarding companies, etc. The flow of information in this new look system is here represented in Fig. 16. As the system gets more organized, the EDI services could be extended to Manufacturing, Banking, Insurance, Distribution networks, etc.

The hard and software service itself does not have to be provided by the Port Authority. It can be contracted out to one of the multitude of third party logistics suppliers that exist. Due to the complexity of the total logistics package however, the ports have to take the initiative in this regard

FIG.16. FLOW OF INFORMATION IN AN INTEGRATED EDP NETWORK



just like their earliest predecessors Bremerhaven, Hamburg, Felixtowe, Amsterdam, and Antwerp. The main objectives should include but not limited to:

- a. Advance documentation
- b. Online EDP control
- c. Equipment management
- d. Equipment tracking
- e. Statistics
- f. Administration including Accounts and personnel.

CHAPTER 6

SUMMARY AND CONCLUSIONS

While containerization continues to increase in importance and usage in developing countries, the need to expand international transport operations beyond the immediate port area is becoming a prerequisite. Serious demands are being made on ports as interface points in the chain of transport both from the vessel as well as cargo points of view. Consequently, any port which attempts to restrict itself to conventional services runs the risk of losing out in terms of its competitiveness in the emerging concepts of international logistics.

This dissertation has dealt with the subject of international freight transport logistics with particular reference to Nigerian ports. The objective was to develop an optimised use of the ports through the integration of port and transport services using the emerging concepts of international logistics. The hypothesis on the other hand was that Nigerian ports are competitive enough to satisfy the functions of a hub port for the West African sub-region. In particular it was desirable to determine if Nigerian ports could capture the markets of its land-locked neighbours through intermodalism.

It was established that the competitive environment for ports has changed dramatically over the years particularly for intermodal transportation. A port can gain a significant share of business only when it can demonstrate a combination of rates, facilities and inland connections that create a

clear competitive advantage over its competitors for an identified market segment.

The study revealed several structural and operational defficiencies in Nigerian ports within the context of this study. One of the major arguments against port authorities as public sector organizations is that they are bureaucracies with thier corresponding shortcomings as is the case with Nigerian ports. Nigerian authorities should therefore consider the possibility of establishing a seperate public service organization which should be responsible for the provision and maintenace of infrastructure, while another commercial organization is given responsibility for investment in superstructure, operating equipment and port operations.

The performance of the ports with particular regards to the factors analysed fall below that of their competitors. Several of those factors will have to be improved. These include more competitive port charges, port productivity and port safety standards. With ocean freight rates down to their present levels, steamship lines will also continue to try and raise freight rates and at the sme time reduce operating costs. Therefore, Nigerian port tarrifs and service levels will have to reflect this trend if their aim is to serve their customers and remain competitive.

In addition to the aforementioned considerations, the transport of containers into hinterlands means that the container vessel now not only reaches the port, but also the hinterland. Consequently, some port functions as well as shipowners' interests in the cargo have also been moved to the hinterland. As a result, shipowners are continually looking at the total service package that a port is able to

offer. This includes infrastructure and in particular the connecting transport system. Nigerian ports, particularly Lagos and Port-Harcourt can take advantage of the existence of rail sidings leading directly to their quay sides. These sidings further connect all the Inland Clearance/Container Depots (ICDs). The success of this operation will however depend on the effective cooperation of NPA and Nigerian Railways which must lead to the coordination of their plans and operations for the consequent optimum allocation of their resources.

As competition in the shipping industry continues, steamship lines will continue to make innovations in the areas of ship design for cost reduction and service improvements. Consequently, ports will continually have to adapt to the technological and service requirements of ships and cargo interests. This requires a high level of understanding between ports, steamship lines, shippers and all other port users. Failure to have such cooperation may result in ports providing facilities that may either be in excess of or below the requirements of their customers.

The existing characteristics of Nigerian ports such as draft limitations, quay length limitations and port approach limitations seriously inhibit their ability to operate as regional ports. The emphasis should more importantly not lie on competing for regional traffic, but rather on the provision of efficient services which would ultimately result in the creation of value added, consumers' and producers' surplus, which are some of the main national economic objectives for ports. Still, it must be remembered that, post Panamax vessels in service and on order are increasing, thereby establishing a trend for a continuing and greater need for hub ports in the future.

As oil continues to constitute an appreciable percentage of operating costs, all parties involved in the movement of goods all along the transport chain will continue to aim at minimising energy consumption by allocating carriage to the most energy efficient means of transportation. As noted earlier, railways have a distinct advantage of being the only mode which can utilize the entire range of primary energy sources which include oil, coal, gas, nuclear and hydro-electric power. This needs to be looked at by Nigerian authorities in their future national transport plans. Though road transport may be able to use electricity, this is presently in extremely limited cases, and this trend is likely to continue into the near foreseeable future. In view of the lower costs per ton-mile offered by barge transportation, Nigeria may expect an increase in the use of barge transport, particularly in the riverine areas in cases where additional transit time is not prohibitive. This would depend on the provision, organization and operation of facilities needed to achieve the corresponding cost savings.

One important function which can help increase efficiency in Nigerian ports is the introduction of EDI services. This will create a dynamic link in the long chain of transport covering steamship lines, consignees and consignors, forwarders, hauliers, rail, Customs, port and liner agents. This will further lead to the implementation of total logistics for Nigerian imports and exports, one of the current preconditions for effective conduct of international business. The Ports Authority may not necessarily provide the service directly. It can however initiate the project in consultation with its customers while the actual service may be contracted out to the multitude of third party logistics providers that exist.

In Nigeria as in most other developing countries, Customs procedures tend to act to inhibit international trade. This is one of those areas where government can act to create the basis for smooth container movement. It would be of much benefit to the nation's international trade, the ports, consumers and producers if the Nigerian government implements some of the relevant international Customs conventions, including the International Multimodal Transport (MT) Convention. While the focus here may be the facilitation of international trade through fast clearance procedures, Nigerian ports must not lose sight of the quality of handling the goods. Speeding up operations can only be meaningful if the quality of cargo handling is not lowered. Safety and security of cargo are some of the main attributes of port efficiency, while damage and pilferage are a sure sign of bad performance.

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